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Sowing seeds for learning: A case study of a school garden in Pocahontas, Iowa

Katie Dirks
Iowa State University

Sowing seeds for learning:
A case study of a school garden in Pocahontas, Iowa

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Katie Jo Dirks

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Francis Owusu, Major Professor
Jane Rongerude
Nancy Grudens-Schuck

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Abstract

This thesis is a study of a school garden in Pocahontas, Iowa, examining three research questions: How was the school garden set up? Why was it set up in that manner? And what are the benefits that stemmed from the garden? Because the school district was short on resources, the community played a significant role in the success of the garden, highlighting the role that planning literature on collaboration theory can play in such a process. I utilized participant observation, stakeholder interviews, and student surveys to collect data for analysis and conclusions. The findings emphasized the importance of open communication, the importance of a knowledge and understanding of relationships with a community and organizations, and factors that contribute to the sustainability of a garden program such as ease of curriculum integration and having one person in charge of the garden going into the future. This study also has implications for relationships between planning and school gardens; because school gardens often rely on multiple stakeholders for sustainability, planners schooled in collaboration are uniquely suited to organize and develop such programs.

Chapter 1

Introduction

Where does food come from? It is a fairly simple question, but it begets a variety of answers; the grocery store, a farm, a factory, a garden. A local foods advocate once told a story about how, after one of his lectures, a little girl came up to him and said, "Don't worry about running out of food, we can always go to the grocery store and get more." This made me wonder - is this really where kids think food comes from? Kids should know that ketchup comes from a tomato plant that they could grow themselves, if they wanted to. Then I realized that, despite growing up on a farm, I really had no idea how to grow food for myself, if I wanted to. How is it that, in a place that claims to feed the world, kids could have no idea how to feed themselves? And so, I went about trying to change that. I went to the elementary school in Pocahontas, Iowa and proposed a school garden. This study details my efforts there, focused on three questions: How was the school garden set up? Why was it set up in that manner? What are the benefits that stemmed from the garden?

The popularity of school gardens has boomed in recent years, growing from a California initiative in 1994 for every school to have a garden, to a nationwide movement represented by thousands of gardens across the nation, with at least one in every state (National Farm to School Network 2010). As the movement has grown, so too has the body of research surrounding school gardens. Studies claim various benefits from school gardens, ranging from increased fruit and vegetable consumption and combating obesity (McAleese and Rankin 2007; Ratcliffe, et al. 2011) to increased

communication skills and test scores for students who are involved (Waliczek, Bradley and Zajicek 2001). Research from the past twenty years has documented the success of school gardens in producing these benefits in varying contexts.

However, a common thread through these studies is that they do not explain the conditions under which those benefits were realized (McAleese and Rankin 2007; Morris and Zidenberg-Cherr 2002; Waliczek and Zajicek 1999; others). Health and human development scholar Emily Ozer (2007) notes that the implementation of garden programs can vary greatly from school to school and classroom to classroom. She argues, "evaluation and research in this area [should] document the specific components of garden programs and the ways in which these program elements are implemented and integrated into the school (p. 860)", and she calls for studies to focus on specific gardens and their implementation to better explain why some gardens achieve certain benefits and others do not. In seeking to establish the benefits of a school garden, studies have largely ignored the factors that contribute to the success and sustainability of the garden program. There are a wide variety of factors that could affect the success of a school garden including, but not limited to; size, availability of resources, curriculum structure, and connections with the surrounding community. This study takes these factors into account and in doing so, adds valuable depth to a body of literature that is currently very broad. It could also contribute to the development of a set of "best practices" for future implementation.

Objectives

This study seeks to add to the current body of research regarding school garden studies. It examines the process of implementing a school garden program in the elementary school in Pocahontas, Iowa in order to better understand not just how the program was implemented, but *why* it was implemented in that manner. To that end, this study examined how communication and relationships between various stakeholders influenced the implementation of a school garden. It also speaks to the benefits experienced by teachers and students through their involvement with the garden. The study involved establishing a school garden and utilized various data collection methods including; participant observation, stakeholder interview, and student surveys, to study the process of establishing the garden and to assess what students learned and other benefits they experienced.

Justification for the Study

Across the nation, school gardens are being implemented as an effective means of enhancing schools' nutrition programs and as a way to educate the students about agriculture and food systems (U.S. Department of Agriculture 2011). There are a number of reasons that students should have this knowledge of food and the food system. The American Dietetic Association argues that a comprehensive school nutrition program, which could include a school garden, is essential for encouraging the adoption of healthy eating habits, encouraging an active, healthy lifestyle, and academic success (Briggs, Safaii and Beall 2003). Trexler and Heinze (2000) also found that there

is a general lack of awareness on the part of consumers, and especially children, about the food system and where food comes from; knowledge that is considered necessary for making informed choices about food purchases and could be increased through involvement in a school garden. Furthermore, as schools face increasing budgetary constraints, school gardens can provide a cost-effective solution for expanding educational options.

At first glance, the selection of Pocahontas, Iowa as a study site for the establishment of a school garden may seem odd. As a small town with a population of 1,750 (U.S. Census 2010) and a strong agriculture-orientation in a state that claims to feed the world, a general assumption might be that children in the community spend plenty of time farming and gardening, and have sufficient knowledge about food and nutrition to make a school garden redundant and unnecessary. However, there are numerous reasons for choosing this particular study site.

Like much of Iowa, the area has an orientation to food production; however, the large majority of that is large-scale corn and soybean production, which does not enter directly into the local food stream. In fact, Iowa consistently ranks first in the nation in corn, soybean, and hog production and Pocahontas County ranks in the top third of Iowa's ninety-nine counties for production in those areas (U.S. Department of Agriculture 2007). Despite this, there is little education at any level in the school system about where food comes from or how it is produced. An exception is the Future Farmers of America (FFA) program, which begins in high school but focuses on large-scale corn, soybean, and livestock production as opposed to small-scale production

such as gardening. Even with this program, the school system as a whole has a clear gap in nutritional education regarding fruit and vegetable production or the sources of the food that we eat. The result is that ignorance of the food system in small agricultural communities can be just as serious as in any other area.

Many studies about school gardens take place in large school districts or low-income areas. However, there are thousands of smaller school districts across the country, and especially in Iowa, that would benefit from a study performed in a similar setting and from which the lessons learned may be more applicable. As Iowa's population shifts to the urban areas, school districts in small communities are faced with declining enrollment and smaller budgets as a result of decreased property tax revenues. Pocahontas County was particularly hard-hit, losing 15% of its population between 2000 and 2010 (U.S. Census 2010). Consolidation is the trend among school districts and competition for students is fierce as the districts that survive seek to boost their enrollment numbers through open-enrollment.

The Pocahontas Area Community School District (PAC) is facing familiar challenges. As the largest school in the county, with a total enrollment of approximately 500 students for the 2010-2011 school year, there is little threat that it will close (Pocahontas Area Community School District 2010). However, many smaller surrounding schools are looking to consolidate and PAC is constantly competing to be the district that they consolidate with. Recent consolidations at PAC have resulted in shake-ups for teachers and at the administrative level, resulting in uncertainty, tension, and resistance to change. Consolidation at PAC has also resulted in the district taking

on the debt of the districts that it consolidated with, putting even greater strain on an already tight budget. At the same time, the district is facing pressure to make itself more attractive to prospective students and parents from outside the district who may choose to open-enroll at PAC. The more programs and extracurricular activities offered by a school, the more attractive it becomes to those students. For this reason, there is often support, at least at an administrative level, for programs such as school gardens. In the state of Iowa, there is also support at the state level for school gardens and Farm to School programs, evidenced by the creation of a program in 2007 to fund Farm to School chapters in the state. The garden in Pocahontas will also offer lessons for how to engage multiple players in a community to support a school garden when other resources are not available. In this case, the status of Pocahontas as the county seat means that there are multiple state and federal agencies with offices in the town. Two of those offices, the Pocahontas County Extension Office and the Pocahontas County Conservation Board, were valuable partners in the creation and sustainability of the garden.

Despite the popularity of school gardens across the U.S., PAC had no plans for implementing a school garden. Indeed, none of the teachers or administrators could recall a time in the last twenty years that the school had a garden or garden program. As a result, it served as a sort of blank slate, allowing a situation where analysis could start at the very beginning of the process.

Structure of the Thesis

This thesis is organized into five chapters. Following this introduction, Chapter Two – Literature Review will review the history of school gardens in the U.S. and discuss the literature available regarding the setup of school gardens. The chapter will also review the research on the benefits associate with school gardens and collaborative planning research, which can be useful for the setup of school gardens. Chapter Three – Setting Up The Garden & Research Methodology will discuss the study area and research design, data collection, and methods of analysis. Chapter Four – Results & Discussion will present the results and discuss the data collected from the study including observations from throughout the process, information on how various stakeholders felt about the garden, and quantitative data from the student surveys. Chapter Five – Summary & Recommendations for Future Programs will consist of a brief summary of the key findings and also discuss the limitations of the study and recommendations for future programs.

Chapter 2

Literature Review

School garden literature tends to fall into one of two broad categories: literature regarding ways to set up a farm to school or gardening program, and research and evaluation studies that examine the benefits of school garden to students. Despite the apparent connection between the two sets of literature, they are rarely discussed simultaneously. This disconnect is problematic because, as Ozer (2007) argues, studies rarely examine the conditions of specific gardens and how those may affect the benefits experienced by students in those garden programs. By more closely examining implementation practices and the benefits associated with those practices, it may be possible to identify the practices that are most effective. This chapter reviews the evolution of school gardening in the U.S. and discusses the two bodies of literature regarding school gardens. Drawing on the planning literature on collaborative theory, I demonstrate how collaboration among stakeholders in implementing a school garden can help to ensure the success and sustainability of school gardens. Collaborative theory stresses the importance of stakeholder participation to ensure the sustainability of projects. Such theory is also useful for school garden projects, which often involve multiple stakeholders.

Evolution of School Gardening Objectives

School gardens are not a new phenomenon. School gardens have increased and decreased in popularity in three "waves" since the early 1900s. A review of the history of school gardens highlights how the motivations for creating school gardens have

changed over time; but also how some, such as the goal of exposing children to the natural world, have stayed the same. It is important to note that school gardens have not enjoyed the support that they are currently experiencing since the era of Victory Gardens of World War II when such gardens were promoted to grow food as part of the war effort. Interestingly, school gardens today enjoy government support as a tool in fighting the "War on Obesity." The following section reviews the history of school gardens in the U.S., focusing on the motivations for the rise and decline in the popularity of school gardens, as well as the support available and details about programs that are currently available for school gardens.

School gardens first appeared in modern times in Europe, in the latter part of the 19th century, with an Austrian law requiring a garden in every rural school in 1869. By 1905, there were over 100,000 school gardens in Europe, located in both rural and urban areas. (Dunnigan 1999). At that time, gardens were used as tools for teaching natural sciences as well as practical vocational skills that were not familiar to children in urban areas (Desmond, Grieshop and Subramaniam 2004).

In the United States, there have been three waves of popularity for school gardens. The first wave started at the George Putnam School in Roxbury, Massachusetts, which established one of the first school gardens in the U.S. in 1891 (Hayden-Smith 2011). From that first garden, a national movement developed, to the point that by 1918 each of the forty-eight states had at least one school garden (Sealy 2001). Much of this rise in the use of school gardens was fueled by progressive education ideals; focusing on the social growth of children by connecting them to the

outside world and giving them a sense of responsibility for living things (Desmond, Grieshop and Subramaniam 2004). School gardens were also seen as a means of imparting upon children a sense of civic responsibility and instilling "American" values (such as the value of hard work, justice, and honesty) in immigrant children (Hayden-Smith 2011; Lawson 2004). Not only that, but they were used as tools to teach precision, efficiency, and other qualities that were considered desirable in an industrial society (Lawson 2004). The popularity of school and community gardens was bolstered by necessity during World War I and World War II, when fruits and vegetables were grown by millions of students and private citizens across the country to combat food shortages during wartime. Victory gardens were also meant to keep morale up by fostering a sense of civic engagement through a mutual contribution to the war effort. In 1917, the U.S. Bureau of Education created the U.S. School Garden Army to promote school gardens that, at its height, involved 1.5 million children cultivating 20,000 acres of vacant land (Lawson 2004). In both WWI and WWII, the government heavily encouraged victory gardens through posters and other propaganda, including a victory garden on the White House lawn (Bentley 1998). After the food shortages of WWII had passed, the focus of education turned to technology and school gardens declined in popularity as playgrounds and football and baseball fields became more important (Sealy 2001).

The second wave of school gardens in the U.S. came about in the 1960s and 1970s as a result of two factors; a "war on poverty" and as a response to increased concern in society about the environment, especially as related to the use of chemicals

in food production (Meyer 1997; Yamamoto 2000). In urban areas, like New York City, school and community gardens were promoted in low-income neighborhoods to generate food and income for poor households, to serve as commuinity meeting spaces, and to provide a meaningful activity for children in addition to the environmental benefits (Wolf-Powers 2008). For a short time, the federal government and social and political organizations encouraged school gardens; but the gardens were ultimately considered ineffective in combating the problems of the era (Damrow 2005). Lacking support, school gardens waned in popularity through the 1980s and early 1990s as more conservative educational and environmental policies developed. This is not to say that there was not a recognition of the need for agricultural education in schools. In 1981, the USDA unveiled the Agriculture in the Classroom program, which was meant to provide instructional materials about food and fiber production to educators across the country (U.S. Department of Agriculture 2011). Agriculture in the Classroom, however, focuses largely on commodity production and large-scale agriculture, making it different from the type of education associated with school gardens.

The third, and most recent, wave of school gardens in the U.S. originated in California in the mid-1990s. In 1994, the California School Garden Initiative was developed by the California Department of Education, lead by State School Superintendent Delaine Eastin. In 1995, the initiaitve became a mandate, calling for a garden in *every* school with the stated purpose to: "Create opportunities for schools to provide dynamic environments that support student mastery of educational standards. Students who participate in school garden projects also discover fresh food and make

healthier food choices, and develop a deeper understanding and appreciation for the environment, the community, and each other" (Hayden-Smith 2007). The intiative received funding from the state legislature through 2002, resulting in the presence of school gardens in approximately 3,000 of California's 9,100 public schools (Hayden-Smith 2007). Also in 1995, Chef Alice Waters launched The Edible Schoolyard at Martin Luther King, Jr. Middle School in Berkeley, California, which has served as an example of how a garden can be fully integrated into a school curriculum to "transform the health and values of every student" (The Edible Schoolyard Project 2011). Since then, the popularity of school gardens has spread throughout the U.S. and is increasingly visible at the national level.

The current wave of popularity in school gardens has received unprecedented support at the national level. In 2009, First Lady Michelle Obama planted a garden on the White House lawn with Secretary of Agriculture Tom Vilsack and students from a local elementary school. The students helped maintain the garden and took part in harvesting vegetables from the garden and learning how to cook with them. The White House Kitchen Garden, planted on the South Lawn, is a part of the First Lady's "Let's Move!" campaign, meant to raise awareness of proper nutrition, healthy eating, and outdoor activity for children across the U.S. (Lee 2009).

The federal government is also providing monetary support for school garden programs. In August of 2010, the U.S. Department of Agriculture (USDA) announced funding for a People's Garden School Pilot program to support the development of school gardens in high-poverty schools and promote knowledge of basic agricultural

production practices and nutrition. In announcing the funding, Mr. Vilsack stated, "Grass roots community gardens and agriculture programs have great promise for teaching our kids about food production and nutrition at the local level. Learning where food comes from and what fresh foods taste like, and the pride of growing and serving vegetables and fruits that grew through your own effort, are life-changing experiences" (U.S. Department of Agriculture 2010). The program is meant to identify models and best practices for successful school gardens that the USDA can then distribute to schools throughout the U.S. The funding is part of a larger USDA program called the People's Garden Initiative, which works to promote the development of school and community gardens across the nation.

The reasons behind the most recent rise in the popularity of school gardens are multifaceted. On the one hand, gardens are promoted for the "greening" of school grounds, especially in urban environments, where such space may be scarce. (Desmond, Grieshop, & Subramaniam 2004; Ozer 2007). A more obvious reason to establish a garden is for the value as an outdoor classroom. They can be used for teaching multiple subjects; the most obvious are math and science, but writing, art, social studies, and others can also be taught in a garden. In additional, gardens provide valuable opportunities for hands-on learning, getting children out of the classroom and applying skills and knowledge in a different environment (Desmond, Grieshop and Subramaniam 2004; Ozer 2007).

The one reason that is unique to the most recent wave of school garden popularity is for the value of gardens as a tool for combating obesity. Between 1980 and

2009, obesity rates in children aged 2-19 years tripled, with 16.9% of children now classified as obese (Ogden and Carroll 2010). School gardens are seen as a way to education children about the benefits of healthy eating and to increase their otherwise limited exposure to fresh fruits and vegetables in the hopes that they will eat such foods as they become more familiar with them (Graham and Zidenberg-Cherr 2005; McAleese and Rankin 2007; Ratcliffe, et al. 2011). School gardens are also used to encourage children to spend time outdoors and to be more active.

Farm to School

As school gardens have become more popular, so too has the establishment of farm to school programs. Farm to school programs vary greatly in size and scope but their main component is an institutional relationship with one or more local producers to supply produce for use in a school lunch program. Farm to school programs also emphasize increasing students' knowledge of where their food comes from so programs often involve school gardens, farm visits, and lessons related to gardens or produce (National Farm to School Network 2010). Like school gardens, the farm to school movement has some roots in California with a program called the Edible Schoolyard in Berkeley, but also in Florida with the New North Florida Marketing Cooperative. Started between 1996 and 1997, these programs were established with the goal of bringing more locally grown produce into the schools' institutional food systems. Similarly, the USDA states that the goals of farm to school programs are to; "meet the diverse needs of school nutrition programs in an efficient manner, to support regional and local farmers and thereby strengthen local food systems, and to provide support for

health and nutrition education" (U.S. Department of Agriculture 2011). The National Farm to School Network lists its objectives as; "serving healthy meals in school cafeterias, improving student nutrition, providing agriculture, health and nutrition education opportunities, and supporting local and regional farmers" (National Farm to School Network 2010). Despite slight differences in wording, the overall goal for these organizations is the same; to get produce from local farms into school cafeterias.

In 2000, the National Farm to School Program, which evolved into the National Farm to School Network in 2004, was established with the support of the USDA to focus on program development, research, and policy[1] (National Farm to School Network 2009). Since then, the USDA, the National Farm to School Network, and others have held multiple conferences and workshops and authored numerous publications to promote the development and establishment of farm to school programs throughout the country. To facilitate local purchases, the Farm Bill was changed in 2008 to allow publicly funded institutions to give preference to local producers instead of being required to choose the lowest bidder. This opened the door for public schools to make purchases from local farmers even if their prices are higher than a larger distributor. Building upon this, the USDA premiered the "Know Your Farmer, Know Your Food" initiative in 2009. The initiative promotes the purchase of local food by individuals as well as institutions. At the same time, a Farm to School Team was established at the USDA to study and promote farm to school programs and facilitate connections

[1] The National Farm to School Program was established in 2000 with funding from the USDA. Although continuation of the program was authorized in 2004, it never received funding from the government. The organization decided to continue as the National Farm to School Network and seek private funding, which it received from Kellogg in 2005 (National Farm to School Network 2009).

between local farmers and institutions (U.S. Department of Agriculture 2011). The passage of the Healthy, Hunger Free Kids Act in 2010 also allocated $5 million each year from fiscal year 2013-2015 to be disbursed in the form of grants to schools trying to establish farm to school programs. As a result of these and other efforts, at least one farm to school program can now be found in all fifty states (National Farm to School Network 2010).

In summary, school gardens have evolved from Progressive Era tools of civic beautification and engagement to their present manifestation as entities that not only enhance educational opportunities but also combat the pressing issue of childhood obesity. Over the last twenty years, they have emerged from a relatively isolated movement in California to a nationwide movement backed by the full support of the White House and the USDA. Along the way, two distinct bodies of literature on school gardens have emerged; resources and guidebooks for setting up school gardens and farm to school programs, and studies that examine the effects of school gardens on students' learning and fruit and vegetable consumption. The following sections will summarize and critique these two bodies of literature.

Creating a Sustainable School Garden

Given the surge in popularity of school gardens and farm to school programs, it is no surprise that there are several resources available that provide guidance and recommendations for setting up such programs. For example, the Food and Agriculture Organization of the United Nations (FAO) provides valuable resources relating specifically to setting up school gardens that can be applied in different contexts around

the world. The state of California also has a well-developed network for sharing resources called the California School Garden Network (CSGN). Moreover, since school gardens are often part of a larger farm to school program, there are many resources available that relating to both farm to school programs and school gardens. Organizations such as the National Farm to School Network, the USDA, and Farm to School networks in each state provide a variety of resources and recommendations. For purposes of this review, three resources were chosen for analysis; guides on setting up school gardens from the FAO, CSGN, and Oklahoma Farm to School program. Although there are many more resources available, these three are representative of the range of information available specifically for setting up school gardens.

The FAO lists three elements necessary for a successful school garden; knowing how to cultivate people, how to cultivate plants, and where to go for help (FAO 2005). Cultivating people refers to bringing in multiple stakeholders to support the garden. Cultivating plants refers to the knowledge required to make things grow. And where to go for help refers to knowing who to turn to if something goes wrong. While these elements are certainly necessary, the reality of setting up a school garden is often very complex. In each situation, it is necessary to ensure that the school would support a school garden. Administrative buy-in is a key first step, allowing plans to go forward with legitimacy and also helping to ensure future success (California School Garden Network 2010). From there, the guides emphasize the importance of planning for a school garden, from who will be involved to how it will be funded to what it will look like. They also agree that school gardens must have a wide base of support in order to

be successful. Therefore, it is necessary to identify and engage possible stakeholders such as; teachers, students, parents, volunteers from the community, and community organizations. It is also important to consider how these stakeholders will be involved and what responsibility they would have in relation to the garden (Oklahoma Farm to School 2008) (California School Garden Network 2010).

Although the guides differ on the exact order of the steps necessary for setting up a garden, they all identify the same basic requirements. The site for the garden must be identified and, if the site is not located on school grounds, plans for arranging transportation must be made. Securing funding is another important factor. Funding could come from the school, grants, community organizations, government sources, and fundraisers; but it is necessary to secure funding for the short-term, and plan for funding in the long-term, in order for a garden to be successful. Before it can be determined how much funding is required, it is necessary to identify what needs to be purchased for the garden, from child-sized tools and gloves to plants and fertilizer. Conversely, if enough funding is not available, the size or scope of the garden may have to be scaled back. Those basic steps are identified almost universally as necessary for successful gardens. From there, guides vary in the depth and breadth of the information they provide.

The FAO provides an extensive resource for setting up a school garden. It covers topics such as; involving families and the community, identifying goals for the garden, planning garden layouts, choosing what to grow, how it will be eaten, and how to keep the garden going (FAO 2005). As a part of the United Nations, the FAO document was

written for use on an international level and, as a result, many of the recommendations are vague or more suitable to an international context. Regardless, the general information in the document can still be useful for gardens in the U.S.

The Oklahoma Farm to School program offers a detailed checklist for setting up and maintaining a school garden. It focuses largely on technical steps and would be very useful for someone who does not have extensive gardening knowledge. It includes lists of tools needed and recommended plants as well as specific steps for garden preparation and maintenance including directions for how to plant, weed, fertilize, and harvest (Oklahoma Farm to School 2008).

As a well-established entity in the U.S., the CSGN offers the most extensive and applicable information for starting and maintaining a school garden in the states. The CSGN guide covers planning the garden, linking the garden to a curriculum, designing and funding the garden, working with volunteers, and planting, maintaining, and sustaining the garden. The guide provides greater detail than the Oklahoma checklist and also offers recommendations for gardens of different sizes, from widow-boxes to larger raised-bed gardens. The guide also provides specific ideas for lessons that would link the garden to a curriculum, making it particularly useful for teachers. The CSGN also notes the importance of setting out goals for the garden at the beginning, including what will be taught in the garden, when will it be used for teaching, what will be grown and how will that produce be shared, and what classes will be using it for what purposes (California School Garden Network 2010).

Each of these guides, and others that they are representative of, is useful for setting up a school garden, providing guides and recommendations for starting what is often a time-consuming and difficult project. The CSGN guide is a wealth of experience from nearly twenty years of school garden creation and sustainability in California while the FAO guide garners information and recommendations from experts with experience from around the world. These guides make it possible to create a plan for a school garden, with knowledge of what will be required to make it successful. However, there are some gaps in this information. There is a lack of recommendations for what to do when a problem arises; no troubleshooting section, for example, with common problems and what can be done to address them. Another problem is that guides need to be tailored to certain areas. Schools in Iowa, for example, will face a different set of circumstances with a different set of resources than schools in California due to differences in climate, resources, culture, timing of the school year, and others. Ideally, there would be networks within each state providing these resources but the school garden movement is so new in some places, such as Iowa, that few have had the time to fully develop those resources. However, no guide can substitute for going through the process and learning from those experiences first-hand.

Benefits of School Gardens

Another body of research regarding school gardens focuses on the benefits of school gardens for students. School gardens have been considered beneficial for various reasons throughout history; from instilling "American" values in immigrants in the Progressive Era to environmental awareness in the 1960s and 70s to the current

emphasis on improving fruit and vegetable consumption and nutritional awareness. The following review will focus on studies undertaken during the most recent wave of school garden popularity in the U.S., and the benefits that have been identified by those studies.

A large number of the studies suggest that participation in school gardens can help increase students' consumption of fruits and vegetables. An increase in fruit and vegetable consumption is seen as beneficial to children's health because, in the U.S. less than half of children aged 4-18 consume at least the recommended five servings of fruit and vegetables a day (Robinson-O'Brien, Story and Heim 2009). The studies take place in a variety of places and at a range of elementary and middle school grade levels but offer similar results. One of the most commonly referenced studies in school garden literature is McAleese and Rankin's evaluation of a 12-week school garden program administered to ninety-five sixth-grade students from three elementary schools. Using 24-hour food recall journals at the beginning and end of the study period to assess fruit and vegetable consumption, they determined a significant increase in fruit and vegetable consumption when students took part in the garden as compared to a control group (McAleese and Rankin 2007). Another study examining fruit and vegetable consumption was conducted by Parmer et al. (2009) and involved 115 second-grade students. Instead of using recall journals, the researchers relied on lunchroom observations of fruit and vegetable consumption before and after the study period to determine change in consumption. Here too, they determined that fruit and vegetable consumption increased significantly when compared to a control group (Parmer, et al.

2009). This study also used questionnaires to evaluate preferences for fruit and vegetables as well as general nutrition knowledge. They determined that there were significant increases in preference and general nutrition knowledge for the group exposed to the garden (Parmer, et al. 2009). Another oft-cited study was conducted by Morris and Zidenberg-Cherr with 213 fourth-grade students who were exposed to nine gardening lessons over seventeen weeks. The students were surveyed before the lessons, immediately after the lessons, and six months after the lessons. Students showed increases in vegetable preferences, willingness to taste vegetables, and nutrition knowledge; and retained much of that knowledge after six months (Morris and Zidenberg-Cherr 2002). A study by Ratcliffe, et al. is unique because it focuses specifically on low-income, urban students. The study group consisted of 320 middle school students who were exposed to a garden for one hour a week for 13 weeks. After the exposure to the garden, students could identify more vegetables, showed an increased preference for and willingness to taste vegetables, and indicated an increased variety of vegetable consumption (Ratcliffe, et al. 2011). Overall, these studies show that school gardens tend to increase fruit and vegetable consumption, as well as willingness to try a greater variety of fruits and vegetables.

The claims for benefits of school gardens go beyond consumption and nutritional knowledge to encompass relationships, attitudes towards school, increased test scores, and others. Two studies examined environmental awareness and attitudes. One, by Waliczek and Zajicek involved 598 students across second through eighth grades from seven schools in Texas and Kansas. The classrooms were given gardening

supplies and a curriculum in return for taking part in a before and after survey for the study. The results indicated an increased environmental awareness after the gardening curriculum (Waliczek and Zajicek, School Gardening: Improving Environmental Attitudes of Children Through Hands-On Learning 1999). Another, involving the same curriculum but administered to a different set of second and fourth graders in Texas, found that students exhibited more positive environmental attitude scores after the gardening program, with greater increases in second grade scores than fourth grade scores (Skelly and Zajicek 1998). A study by Klemmer et al. (2005) examined science achievement scores in 647 third, fourth, and fifth grade students comparing those with exposure to a gardening curriculum to those without exposure. The study found significantly higher scores in third and fifth grade boys, and fifth grade girls who had been exposed to the garden curriculum. On a social level, Waliczek et al conducted a study examining interpersonal relationship skills using the same 598 students from the environmental awareness study and found significant increases in interpersonal relationships skills across the sample set (Waliczek, Bradley and Zajicek 2001). Another study, conducted by Robinson and Zajicek utilized the Life Skills Inventory to assess changes after a one-year school garden program involving 281 third, fourth, and fifth graders. Here too, students scored higher on the Life Skills Inventory after the garden when compared to a control group (Robinson and Zajicek 2005).

This literature indicates the numerous benefits that may stem from school garden programs but the studies are not without issues. There is no standardized garden curriculum so it is difficult, if not impossible to compare or replicate studies.

One method for addressing this issue would be to provide a detailed description of the garden curriculum and implementation, which would allow for some cause and effect connections to be drawn as well as a greater understanding of each study. However, only one of the studies reviewed above (Ratcliffe, et al. 2011) provides such a detailed description. Not only does this make replication difficult for researchers, it also makes it difficult for those involved with garden programs to measure the effectiveness of those programs. Ozer (2007) notes that, because of the wide variation in the implementation of garden programs from school to school, and even classroom to classroom, there is a need for studies that record details of planning and implementation. This would allow for a more accurate measure of the effectiveness of any garden program.

Collaboration & School Garden Sustainability

School gardens tend to be more successful and sustainable when a wide variety of stakeholders are involved (California School Garden Network 2010). Guides unanimously recommend gaining support for gardens from a variety of stakeholders to increase the chances of success (California School Garden Network 2010; Food and Agriculture Organization of the United Nations 2005; Oklahoma Farm to School 2008). It follows, then, that collaboration literature, with its emphasis on engaging multiple stakeholders, can be applied to school gardens. Because they often work with many stakeholders, planners have contributed significantly to the literature on collaboration. The principles of collaboration theory focus on process rather than scale and as a result, can easily be applied to small-scale projects, such as a school garden.

Some explanation of collaborative theory is necessary. The principle behind collaborative theory is that multiple stakeholders with different interests but committed to working towards a common goal or to solve a common problem can develop a better solution to a problem by working together than any individual stakeholder could develop working alone, using each other to test and develop ideas. A truly collaborative process requires stakeholders to gather together to engage in face-to-face dialogue and to share their interests, concerns, and expertise with the group (Innes and Booher 2010).

John Forester, Patsy Healey, and Judith Innes are prominent names in literature on collaborative theory. Forester, in his 1989 book *Planning in the Face of Power*, focuses on power relations and how traditional power structures can be changed through the efforts of planners to bring multiple stakeholders into decision-making processes. He states, "by learning how… the powerless are kept powerless… planners can also learn how to counteract these conditions: to organize, politicize, and empower citizens to create the possibility of genuinely democratic politics" (Forester 1989). Forester rejects the notion that planners should be rational cogs without power, simply feeding information to those who make decisions. The genuinely democratic processes that he envisions require that the needs and wants of all stakeholders be taken into consideration. The role of the planner, then, is to bring the stakeholders together and to facilitate such gatherings so that the power relations that may characterize interactions elsewhere do not enter into the collaborative process (Forester 1999, Forester 1999a).

Healey (1999) approaches collaboration from an institutionalist perspective. She argues that it is through institutions that individuals develop their ways of thinking and acting, making institutions not just organizations, but a way of addressing social issues. Collaboration, then, is a way of changing those institutions. Addressing governance, Healey draws on Habermas's theory of communicative action, which calls for the voices of all parties to be heard in decision-making. The conversation, for Habermas, is the ideal method of communication. A good conversation requires trust between parties so that knowledge can be exchanged and lead to a greater understanding of issues (Healey 1999). Healey notes that these conversations are necessary in order to get away from decision-making based on selfish interests and towards collaborative consensus-building that takes into account various interests (Healey 1997). Not only that, but interaction and knowledge sharing can break down the information silos that are so common in government and institutions today (Healey 1997). Of course, changes to governance structures and the ways that decisions are made do not come about independently and Healey lays out some guidelines for encouraging a collaborative process; focusing on relations and trust between parties, paying attention to local knowledge and ways of reasoning, and encouraging parties to talk to each other in a common context (Healey 1997).

Judith Innes focuses less on power and more on how communities and regions can work together to come up with better solutions to problems; considering how questions are framed within collaborative processes and what characteristics make these processes more or less successful. Planning is therefore "an interactive

communicative activity" with planners are "deeply embedded in the fabric of community, politics, and public decision-making" (Innes, 1995 p. 183). She argues that instead of focusing on quantitative data and systematic analysis in order to make generalized statements, planners should focus on qualitative analysis and seek to understand the unique characteristics of each situation in its particular context, taking into account details that may be crucial for success (Innes 1995).

Collaboration, then, is not a formula that will solve every problem based on generalized experiences, but a method that encourages taking into account local context and local stakeholders to address issues. Innes notes that collaboration requires that all stakeholders be aware of the common problem or goal they are working towards, engage in face to face dialogue, share all relevant information with eachother, and ensure that all views are expressed and listened to (Innes and Booher 2010). Each stakeholder must be considered equal, regardless of the power or lack therof weilded by the stakeholder outside of the collaborative process. The communal learning, talking, and building of trust means that when a decision is eventually reached, it is more resilient than one reached without collaboration, with a wide base of support.

Although the goal of any collaborative process is consensus, that is not the only end product of collaboration. Collaborative processes often result in opening new lines of communication between stakeholders, the establishment of relationships, and the discovery of synergies, which translates to improved problem solving and adaptive capacity in the future. (Innes and Booher 2010, Ch. 1) Collaboration is especially useful in the current economic and political climate because many communities and

organizations find themselves strapped for resources and unable to operate with complete self-sufficiency. As a result, they are forced to look to others for assistance in creating and sustaining successful programs.

With this background, it is easy to see how collaboration could be used as a strategy for implementation of a project like a school garden. Manuals for setting up school gardens note that the involvement of multiple stakeholders is necessary for success and collaborative theory gets at the reasons why this is the case. Benefits of collaboration for a school garden project include; bringing in stakeholders with a variety of skill sets and resources, fostering a sense of ownership within the community at large because so many would have an interest in the project, and creating relationships which can be utilized in the future. All of this contributes to the overall sustainability of a garden program. So although school gardens may not seem to fit in the realm of planning, the process of establishing them would benefit greatly from the collaborative skills that a planner would bring to the table.

The outcomes of collaborative processes are desireable but they are not necessarily easy. Takahashi and Smutney (2001) identify challenges to collaborative partnerships, especially for community based organizations (CBOs), at three levels: contextual, institutional, and individual. Contextual challenges refer to increasingly turbulent environment in which CBOs function; from demographic shifts brought on by immigration patterns to dealing with changing funding streams and power relationships as the political environment changes, all happening at a faster pace than in the past. Institutional challenges refer to a lack of reliable long-term funding, lack of

a solid organizational structure, and high turnover within the organizaion. Individual challenges refers to a lack of commitment, trust, and shared goals between people within an organization as well as between organizations that are trying to work together. (Takahashi and Smutny 2001) These same challenges are facing schools and so, should be taken into consideration when setting up a gardening program or involving schools in any collaborative process.

Many of the challenges facing communities are also facing schools. Many schools are dealing with tight budgets and programming cuts while at the same time being pressured to produce higher test scores and offer more opportunities for students. As a result, they are being forced to look elsewhere for support for programs like school gardens. Literature about the setup of school gardens consistently lists buy-in from a wide variety of stakeholders as an essential element for success so that success is not entirely dependent on one resource, requiring sustained engagement by stakeholders in order to keep the garden program going year after year (California School Garden Network 2010). Similarly, collaboration focuses on bringing stakeholders together to find consensus which can be supported by all and to establish relationships that ensure collaboration in the future. Furthermore, the new lines of communication and relationships that are often the result of collaboration could be particularly useful for schools beyond an initial garden program. The relationships can provide even more opportunities for outreach and involvement with the surrounding community, which would be beneficial for all stakeholders.

In summary, the literature reviewed above informed this study in multiple ways. The information on setting up school gardens was used as a guide for setting up the garden in Pocahontas and the collaboration literature served to inform interactions between stakeholders. The studies on benefits served two purposes; one in encouraging the school to develop a garden program because of the benefits that had been experienced by so many others and also for developing the tools used to assess the benefits of this particular study. Before discussing the analysis of the data collected from this study, the next chapter will review the methodology that was used to conduct the reasearch and analyze the data collected.

Chapter 3

Setting Up the Garden & Research Methodology

This particular study is an explanatory case study; studying how a particular school garden program was established and the problems and benefits that were experienced, seeking to identify underlying principles or methods that can be used in future garden projects. As an explanatory case study, it also employs experimental elements; essentially testing the effect of the garden program on students and other stakeholders, through the use of qualitative and quantitative methods. The goal of a case study is to capture the unique complexities of a single case, analyzing interactions within a particular context and learning from them to broaden understanding (Stake 1995). Case studies are most useful in answering questions of *how* and *why*, providing a nuanced and in-depth analysis of a given subject, whether than subject would be a program, individual, organization, institution, or event (Yin 2009). Ozer (2007) notes that an in-depth understanding of the implementation and effects of school garden programs is exactly what is missing from the body of research.

Study Area Context

The study site is located in Pocahontas, Iowa, the county seat of Pocahontas County, a small town in the northwest part of the state. The town has a population of 1,750 according to the 2010 Census and, like many rural areas of the state, has been losing population for decades. Pocahontas County has the dubious honor of having lost the greatest percentage of population (15%) from 2000 to 2010 (U.S. Census 2010), in contrast to the statewide trend of slow but study population growth (Fig. 3.1).

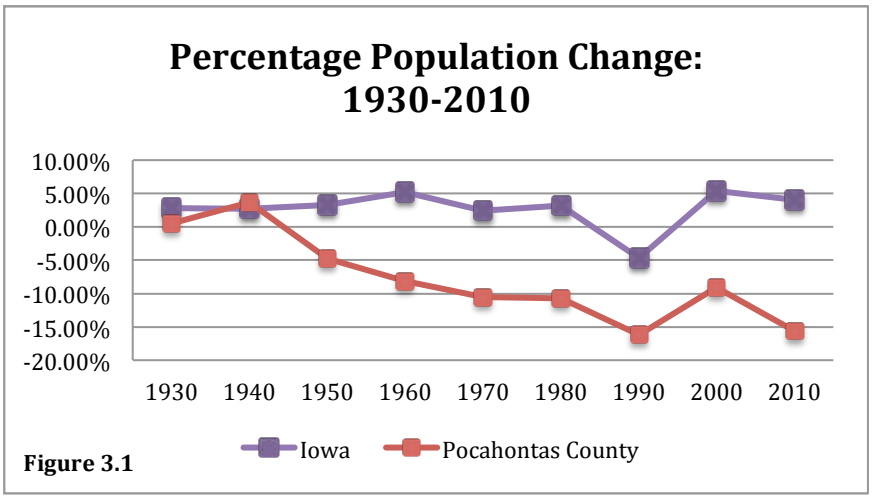


Figure 3.1

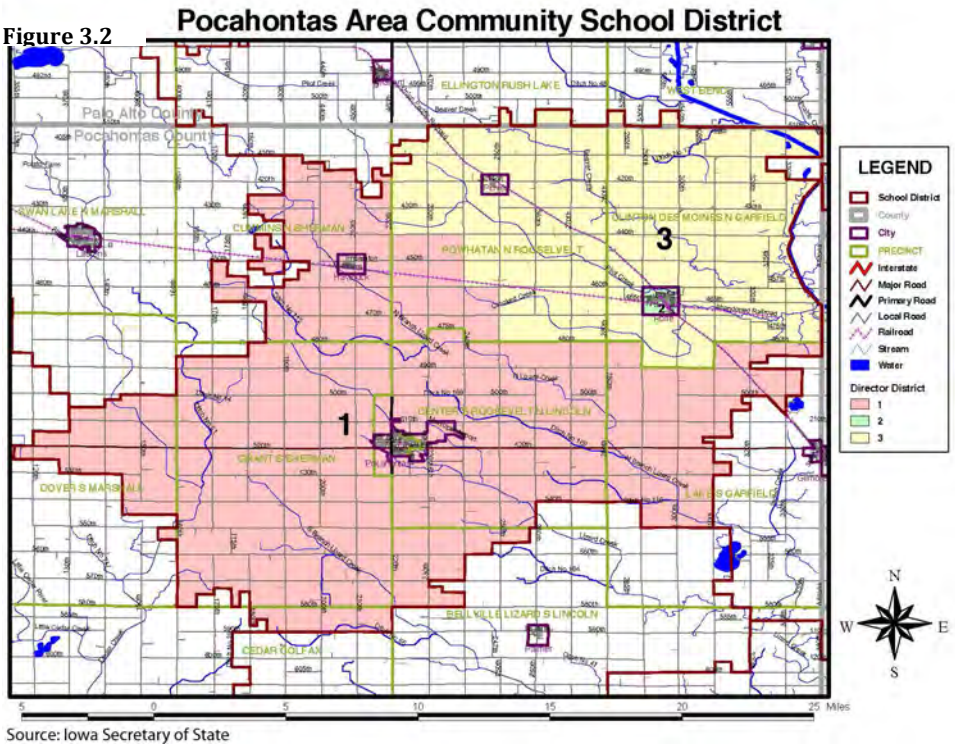
Source: U.S. Census

Pocahontas County has a strong agricultural background, consistently ranking in the top third of Iowa's ninety-nine counties in corn, soybean, and hog production (USDA 2007). As the largest town in the county and the county seat, Pocahontas is the location of choice for a variety of federal, state, and county agencies that serve the area, as well as many local businesses. Pocahontas is also the primary location of the PAC School District , with which this study was conducted. The PAC district is the product of the consolidation of nine schools over the past 30 years and now encompasses most of the county (Fig. 3.2) and had a total enrollment of approximately 500 students in K-12 for the 2010-2011 school year (Pocahontas Area Community School District 2010). This is a common story for many school districts across the state, which have consolidated to save money as enrollment drops.

During the 2010-2011 school year, the Pocahontas Area Community School District (PAC) was going through numerous changes and uncertainties. These resulted in a general apprehensiveness towards new projects and change in general, which, in turn, affected how the garden program was implemented. School districts across the state are dealing with similar challenges and so, this case study may serve as an

example of how to deal with them. At the beginning of the 2010-2011 school year, PAC was in a sharing arrangement with Pomeroy-Palmer (P-P), a nearby school district. This meant that the superintendent, middle school, high school, and sports programs were shared but each school maintained separate accounts and budgets, school boards, and elementary schools. While we were in the process of implementing the garden program, the school boards voted to consolidate. In this instance, consolidation meant that the elementary school for the enlarged district would be located in Pocahontas, closing the P-P location; the middle school would be located in Palmer; and the high school would be in Pocahontas. Because the schools had been in a sharing agreement for a few years, the only major change was the closing of the P-P elementary school and the acquisition of P-P's debt and other accounts by PAC. This also meant that some elementary teachers would likely lose their jobs and there was no guarantee that the teachers in Pocahontas would be the ones who stayed, adding to the stress on elementary teachers.

Figure 3.2



Source: Iowa Secretary of State

There were also shake-ups at the administrative level. The 2010-2011 school year was the first for the new elementary principal, Jodee Jorgenson. The previous principal had been with the school for over 20 years and was well liked and respected by both students and teachers. A new principal meant that there would be changes in the way that business was conducted and decisions were made at the elementary school. Another sharing arrangement made the transition even more difficult was between PAC and Gilmore City-Bradgate, another nearby school district. This arrangement called for Mrs. Jorgenson to spend two days a week in Pocahontas and three in Gilmore City, meaning that there was not always leadership present at the elementary school.

At the state level, the Iowa Department of Education started requiring that all curriculum elements be directly linked to one or more of the Iowa Core Content Standards and Benchmarks. This meant that teachers already had to review their curriculums to ensure compliance and change them if they were considered not in compliance. These changes and uncertainties had a large effect on how the garden program was implemented, which will be discussed later.

Although school gardens have enjoyed an increase in popularity across the nation for the last decade, in Iowa the concept of a school garden is still catching on. Because agriculture plays such a prominent role in the state, one might assume that people who live in Iowa are very knowledgeable about the food system. However, this is not necessarily the case. Children who grow up surrounded by corn and soybeans may have very little idea where the food on their table came from or how to grow it

themselves. Part of this is due to the lack of agricultural diversity in the state and Pocahontas County where 99.8% of crop production is corn and soybeans (U.S. Department of Agriculture 2007). Indeed, one teacher stated, "Some of them, they've never seen a garden. They've never done that… They grew up in town, that's all they know." This is where school gardens come in. There are currently only sixteen farm-to-school programs, which often include school gardens, in the state (Iowa Department of Agriculture and Land Stewardship 2011), which is on the low end when compared to other states. For example, Minnesota has over 100 farm-to-school programs and California has over 150 programs, involving over 1,000 schools, but Nebraska has just two (National Farm to School Network 2010). The existence of a school garden alone does not qualify as a farm to school program, nor does the existence of a farm to school program require a school garden[2]. However, the two are often related and from this data, one can infer that the presence of school gardens in the state is limited. Because of the limited presence of school gardens in the state, the Pocahontas Area Community School (PAC) garden can serve as an example for similar districts in setting up school garden programs.

Setting Up the Garden

When I contacted the school in late 2010, PAC had no school garden program, nor were there any plans for starting one. Indeed, within the last twenty years, none of the teachers or administrators I spoke with could recall a school garden. The ensuing

[2] A farm to school program entails some sort of arrangement for a farm or garden to provide food for the school's lunch program. School gardens are generally used as instructional tools, not to provide food for the lunch program, although they may in some cases.

process of setting up a school garden in Pocahontas turned out to be far more difficult and complex than I had imagined and the plan for the garden underwent numerous changes from the way I had initially envisioned to the eventual implementation. My research encompassed the time of first contact with the school in October 2010 until the final interviews and garden visits in October 2011, and the various steps that were taken along the way.

The first person I approached about the possibility of implementing a school garden was the elementary principal, Mrs. Jorgenson. Her support was necessary for going forward because the program would be implemented in her school. The idea at this point was vague. I had consulted various websites and handbooks about setting up a school garden, read about the benefits of school gardens, and had also spoken with the school garden coordinator in Independence, Iowa to get an idea of how another program in the state was implemented. Mrs. Jorgenson was very supportive of the idea and encouraged me to present it to the school board for approval. We agreed that she would talk to the teachers for kindergarten through third grade to see if they would be open to the idea. These grade levels have more flexible schedules, allowing for easier implementation of a new program that would take them out of the classroom.

Mrs. Jorgenson took the responsibility of speaking with Mr. Kramer, the district superintendent and said that he, too, would support the program. He also confirmed that the school had no money to spare for tools and materials for a garden but that they would be able to provide transportation from the school to a nearby site. Although I had initially thought it best for the garden to be in the schoolyard, there was no space

for it. The playground was already cramped at recess and taking up additional space with raised garden beds was out of the question. It was clear that funding had to come from another source and that community involvement would be necessary.

Before the presentation to the school board, I started working in the community to line up people and organizations (a.k.a. "stakeholders") that might be willing and interested to help with this program. This list included the Pocahontas County Extension Office, Pocahontas County Conservation Board, PAC Future Farmers of America (FFA), the local grain elevator (Pro Co-operative), and Pocahontas County Master Gardeners. Each organization could contribute in a specific way. Pocahontas County Extension Office suggested partnering with the school garden to create a 4-H club around gardening where 4-H kids could grow vegetables to show at the fair and also help take care of the school's beds through the summer. Extension also mentioned the "Growing in the Garden" curriculum that was developed at Iowa State University as a resource for the teachers. There was also the possibility of receiving a grant from Extension to purchase materials for the garden. The Pocahontas County Conservation Board offered land located in town for the garden site and also offered the use of their gardening tools. The Conservation also offered to run a summer program for students and to help maintain the garden through the summer. The FFA could be involved because they maintain a greenhouse at the high school in which seedlings for the garden could be grown. Pro Co-operative is by far the largest business in Pocahontas and as such, could likely be approached to support an agricultural education program. Master Gardeners could be involved as classroom partners, serving as expert resources

for teachers who may not be familiar with gardening. These stakeholder contributions and plans for the garden were then presented to and approved by the school board on November 8, 2011.

As luck would have it, another person who was making a proposal to the school board that evening turned out to be a valuable resource. Sue Jarvis, one of the high school science teachers, listened to my proposal and mentioned to the board that she would be happy to get one of her classes involved with growing the seedlings and also that she would be interested in taking on the responsibility for maintaining the garden program into the future.

After the school board had given approval to go forward, Mrs. Jorgenson and I met with the teachers who were going to be involved; to explain the idea to them and answer any questions that they might have. The teachers seemed to like the idea, although they also seemed wary of taking on a new program in light of all of the other changes happening in the school district. They also liked the idea of partnering with a Master Gardener because a couple of them had minimal gardening knowledge. After our short, initial meeting, Mrs. Jorgenson decided to serve as the communication hub between the teachers and I. She also decided that only first and second grade should be involved, consisting of two classrooms per grade with approximately 15 students in each classroom. She suggested that, to make it easier for the teachers, I find lessons that would be useful for their classrooms. After perusing numerous sites and lesson plans, from the California School Garden Network to the USDA's Ag in the Classroom, I chose the "Growing in the Garden" curriculum developed by Toering and Naeve (2008)

at Iowa State University. "Growing in the Garden" made sense for a couple of reasons. First, it was developed in Iowa so the lessons contained in the curriculum listed the ways in which they related to different standards and benchmarks. Also, because it was developed by Iowa State, there were people within the community, such as Master Gardeners and 4-H club leaders, who had been trained on teaching the curriculum and could be consulted for help, if necessary.

I laid out for Mrs. Jorgenson my vision for how the garden program could be implemented. There would be four raised garden beds, one for each classroom. That way, the teachers could do what they wanted with the bed; deciding which plants to grown, how to maintain it, and how to use it in their lessons. Raised beds were chosen because they are easier to work in, make weed control easier, and, because the land we were using tends to be very wet, would ensure that the garden would not be too wet for the plants to grow. Ideally, starting in early April, the teachers would teach one or more lessons a week in preparation for planting in the garden such as; choosing what they would plant, talking about how a seed becomes a plant (since we would be planting seedlings), what a plant needs to grow, etc. The idea was to limit interference with their curriculum and supplement what they were already teaching.

It is important to note that the development of the garden program was an ongoing process that changed depending on the input from the teachers (through Mrs. Jorgenson) and the resources that could be obtained from the community. I started out with a vague idea of how the program would develop and it gradually took shape over time. For example, the size of the garden depended on the number of classrooms that

decided to be involved in the program and those that were involved chose to be involved. In making the development of the program gradual, I hoped to avoid alienating any stakeholders by forcing a program upon them.

Community Contributions

Lacking resources from the school to create the garden, I went about making the most of my connections within the community. As noted earlier, the Conservation had significant resources available, the largest of which was the availability of land for the garden, as well as some tools and fencing that could be used. Corinne Peterson, the County Naturalist, who is in charge of education and outreach at the Conservation, was also a valuable resource. She volunteered to take care of the garden when students could not make it out and she also proposed doing a summer garden camp through the Conservation, giving students a chance to continue their involvement through the summer instead of taking a large break in the middle of the growing season. This was mutually beneficial because the students would continue learning and the attendance would be counted in the Conservation's outreach numbers. Mrs. Peterson was also one of the leaders for the Pocahontas County Master Gardeners. I told her about my idea to partner a Master Gardener with each classroom and she said she would ask for volunteers. Unfortunately, there was very little interest on the part of the Master Gardeners so the idea was not pursued any further.

Next, I arranged for my family to construct and donate the four raised beds using wood from a building that they were tearing down. This saved significant amounts of money because kits for raised garden beds can cost over $200 each. Finding the soil to

fill the raised beds was another issue. The school had soil left from construction projects but it had been earmarked for landscaping and infill. Mrs. Peterson noted that the Master Gardeners would have some used potting soil but that it would probably not be enough to fill four beds. So, I called the supervisor for Pocahontas County Secondary Roads. The secondary road crews regularly remove silt from road ditches, excavate tile lines, and take out field driveways, so they often have soil available. I requested soil for the garden and they volunteered to deliver an entire truckload to the Conservation site.

Garden Resources	
Item	**Donated By**
Land	Pocahontas Co. Conservation Board
Tools	Pocahontas Co. Conservation Board
Raised Beds	Dirks Farms
Soil	Pocahontas Co. Secondary Road
$500	Pro Cooperative

Table 3.1

The donations of beds and soil, along with the tools and materials available from the Conservation were essential; however, money was still necessary for expenses such as seeds, gloves, and additional tools. For this, I approached the local grain elevator, Pro Co-operative. Pro has a history of generous support when approached for funding in the community. Also, I thought that they might be likely to support a program related to agricultural education. I requested $500, knowing that this would be enough to support the garden for at least 3-5 years into the future and that the amount was small enough that Pro would be likely to donate the whole amount. Pro agreed to donate the $500 for the garden. Table 3.1 is a list of the contributions from the community that made the garden possible. Part of the $500 was used to purchase seeds and a copy of the "Growing in the Garden" curriculum, and the rest will be used to support the garden in the future.

Working with Teachers & Volunteers

Through the setup process, I regularly emailed and met with Mrs. Jorgenson, Mrs. Jarvis, and Mrs. Peterson to ensure that plans were progressing. Mrs. Jarvis had started seeds in the greenhouse with her sophomore science class in April and Mrs. Jorgenson assured me that the teachers were still on board and that they would start teaching the garden curriculum in the classroom after Easter, which was on April 24th, a few weeks later than initially planned. Mrs. Peterson took care of setting up the physical garden; placing the beds and putting the soil in them. Although we had hoped that we could plant the garden in the first week of May, spring came late and we scheduled Tuesday, May 17th as our planting day. In the week leading up to the planting, Mrs. Jarvis took her high school class out to the garden and worked on preparing it for planting. She assigned four students out of the class to the garden and they worked on soil testing and garden layouts in preparation for the elementary students.

Planting day was a success, but it was not without surprises. The plan had been for each classroom to have their own garden bed that they could take care of and develop a sense of ownership. Also, on the day of planting, Mrs. Peterson, Mrs. Jarvis, and I had been expecting one grade at a time, which would amount to 30 students split between two beds. However, plans for the planting day on the elementary side were not finalized until the day before and we were informed that both first and second grades would be coming at the same time. The teachers had also split up their classrooms so the students could interact with students in the other grade, thereby

making it impossible to assign one bed to each classroom. This did not have a noticeable impact on the project. However, if classrooms had been able to make multiple trips to the garden, it would have been preferable for each to have its own bed so that each classroom could plan and have responsibility for their own garden.

Plants in the Garden
Tomatoes
Eggplant
Peas
Green Beans
Carrots
Onions
Peppers
Kohlrabi
Squash
Cucumbers
Marigolds

Table 3.2

Planting was a whirlwind experience but overall, it went smoothly (Table 3.2 contains a list of what was planted). Within 45 minutes, all the beds had been planted and the paths between them covered in mulch. The seeds were not perfectly spaced and the rows were not exactly straight, but the students left with dirt on their hands and smiles on their faces.

Unfortunately, the planting took place during the last week of school so the students had only one time in the garden during the spring. However, the Conservation did offer a summer program to the students who had been involved with the planting. From the two grades, 18 students chose to work in the garden through the summer, watching their plants grow and even taking some vegetables home. With the help of the students, who worked in the garden twice a week, Mrs. Peterson took care of the garden for the summer so that the program could continue for the school in the fall.

Fall in the Garden

Before starting the school year in the fall, I interviewed the teachers who had been involved with the program to see how they felt about the program and if any changes needed to be made before we started making plans for the fall. This was also

necessary because Mrs. Jorgenson, the elementary principal who had also been the go-between for the teachers and I, had left the district. I needed to meet with the new principal, Aaron Davidson to ensure that he would support the program and allow it to continue. The only change the teachers requested was that, going forward, I communicate directly with them regarding the garden program. When I met with Mr. Davidson, he was very supportive of keeping the garden program and agreed that it was best to communicate directly with the teachers instead of going through him.

Students made their first fall visit to the garden on September 2nd, during the second week of school. First, second, and third grade teachers had all expressed interest in spending some time in the garden so each grade arranged to come out separately for about 45 minutes each. The teachers had requested that Mrs. Peterson and I teach a lesson while they were out at the garden so we chose to talk about local food. We covered the meaning of the term "local foods," the benefits of buying local food, and what we would eat if we ate locally year-round. Each grade also had a separate activity in the garden; third grade harvested tomatoes, second grade harvested onions, and first grade planted some cool-weather vegetables. Two weeks later, when I asked if the classes would like to return, first and second grade both replied that they would prefer to continue with their regular curriculum, while third grade said that they would go if they were needed. The visit was postponed until it could be more convenient for the teachers. When I asked again, in late September, if the classes would like to return for a final harvest day, only first grade indicated that they would like to make another visit to the garden. First grade made their second and final visit to the

garden on October 6th, harvesting some of the last vegetables. Second and third grade ended the project with the post-garden surveys on October 5th. In the end, each student had the opportunity to visit the garden just two times.

Data Collection

This case study can be viewed as a two-part experiment. In one part, I am studying the implementation of the program, where my facilitation of the setup of the garden was the agent causing change. In the other part of the experiment, I study the benefits of the program; in which case the agent causing change was the garden itself. To gather the information about what had happened as a result of these catalysts, I used three data collection methods: participant observation, stakeholder interviews, and student surveys.

1. Participant Observation

The bulk of the data collection for this study relied on participant observation. With participant observation, the researcher takes an active role in the situation that is being studied (Atkinson and Hammersley 1994). Participant observation is part of what Michael Burawoy (1998) calls the reflexive model of science; a model that focuses less on the scientific method ideals of objectivity and control but instead promotes engagement with the people being studied in order to more accurately understand the situation and their actions. The reflexive model promotes participation observation as the catalyst that causes reactions that can then be studied (Burawoy 1998). In this

study I served as the catalyst; introducing the idea of a school garden and working to implement it, while studying the process that I was a part of.

The participant observation method is widely used in ethnographic research; however, it is suitable for studying many subjects. Jorgensen (1989, p.13) lists minimum conditions that should be present for participant observation to be most appropriate:

- the research problem is concerned with human meanings and interactions;
- the phenomenon of investigation is observable within an everyday life situation;
- the researcher is able to gain access to an appropriate setting;
- the phenomenon is sufficiently limited in size and location to be studied as a case; and
- the research problem can be addressed by qualitative data;

This study meets all of those criteria; it involved studying students and other stakeholders as they take part in lessons or setting up the garden. The study is limited in scope to one growing season and to a single community, and qualitative data can be used to answer the research questions.

Much of the rationale behind participant observation lies in the unique perspectives that are gained from being able to observe a situation from within. Jorgensen (1989) argues that a situation cannot be truly understood until the culture and language used within that world are understood. Although the statement clearly relates to ethnographic research, it can easily be related to this study. Within a school

and a community there is a culture, stories, and relationships that exist, which affect the ability to set up a school garden and the understanding of that process. It is necessary with participant observation for the researcher to establish a rapport with the people who are a part of the study and to maintain relationships with those people (Jorgensen 1989). Therefore, it follows that a researcher would choose a site with which he or she is already familiar or has established relationships; as in this case where the study site is my hometown.

Researcher's Background

As noted above, this case study takes place in Pocahontas, which is my hometown. The relationships that I maintained prior to starting this study helped in numerous ways to facilitate the establishment of the garden program. Through the work and community involvement of my family and myself, I was a familiar face to all of the stakeholders that I approached for the garden program. Also, the school board and administration were enthusiastic about a former PAC graduate coming back into the community to establish a new project; support that may have been less forthcoming to a person that was not familiar with the school or community. That familiarity gave me instant credibility with stakeholders, facilitating the establishment of stakeholder relationships and the program itself. The only challenge that I would associate with my familiarity would be with some of the responses for the stakeholder interviews. The teachers may not have been completely honest if they disliked the garden or the issues that they may have had with the setup of the garden because they would not want to

hurt my feelings although I did my best to cross-reference their responses to my observations.

Participant Observation in Pocahontas

Participant observation involves multiple methods of data collection to fully understand the situation being studied. The primary method is the researcher's direct observations of interactions, relationships, and processes; so field notes are an important part of the research. This may also include pictures, newspaper articles, emails, and other documentation. Additionally, conversations, interviews, and even quantitative tools like surveys can be used to broaden the knowledge gained through participant observation. For this study, I documented my interactions with the various stakeholders through emails and field notes taken throughout the implementation process regarding conversations and meetings. In this manner, I closely recorded the decisions that were made throughout the implementation process and the reasons for those decisions. I also observed the students when I was in the classroom for the pre- and post-garden surveys and during their visits to the garden (Table 3.3), watching for their attitudes and reactions about the garden.

Timeline	
Date	**Activity**
11/8/10	School Board Approval
04/05/11	Pre-Garden Surveys
05/18/11	Planting
09/02/11	Fall Visit - Harvesting
10/05/11	Post-Garden Surveys

Table 3.3

No student, during the course of the school year, visited the garden more than two times. The students who were given the survey were in first and second grade when the garden was started and second and third grade in the fall. They each made

one visit to the garden in the spring and one in the fall. The students who were in first grade in the fall were not given the survey but were still part of the field observations. Those students visited the garden twice in the fall.

2. Stakeholder Interviews

In addition to my observations and experiences in setting up the garden, stakeholder interviews provided important insights for understanding the process of setting up the garden and the perceived benefits of the garden. The stakeholder interviews were useful for understanding the process of setting up the garden as it was experienced from different perspectives, which also served as a reference to ensure that my observations were correct. They also served as an evaluation of the program and were useful for identifying changes to be made for the future sustainability of the program.

Stakeholders Interviewed	
Name	**Involvement**
Terri Allen	1st Grade Teacher
Jackie Boysen	1st Grade Teacher
Jane Schott	2nd Grade Teacher
Angie Carter	2nd Grade Teacher
Terri Samuelson	3rd Grade Teacher
Angie Cook	3rd Grade Teacher
Sue Jarvis	High School Teacher/Future Garden Organizer
Corinne Peterson	Pocahontas County Conservation Naturalist

Table 3.4

The list of stakeholders interviewed and their involvement with the garden can be found in Table 3.4. They include the six elementary teachers whose classrooms were involved with the garden program, the high school teacher whose class was also involved with setting up the garden, and the Naturalist at the Pocahontas County Conservation Board. The elementary principal, Mrs. Jorgenson, is

missing from the list because she took a position at another school and could not be reached for an interview.

Stakeholder interviews were conducted in August, September, and October 2011. I arranged to meet with each of the teachers at school, which they had selected as the site that was easiest for them. I met with Mrs. Peterson at the Conservation Office, which she had selected as the site that was most convenient for her. I prepared an interview protocol (see Appendix A) to serve as a guide. Most of the questions were open ended to allow for elaboration of opinions and ideas. I ensured that each area of the interview protocol was covered; however, the participants largely determined the direction that the interviews took. Each of the interviews lasted 30-45 minutes. The areas covered in the interviews included; initial feelings about the garden, communication during the setup process, benefits of the garden, and changes that could be made going forward.

3. Student Surveys

The third data collection method was the student pre- and post-garden surveys, which were given to each student who participated in the garden program in both the spring and fall. The principal and teachers decided that the first and second grade classrooms would be the ones to participate in the first year of the program. I had left this decision up to the principal and teachers, only requesting that at least one full grade be involved. I did not want to force anyone to be involved in the project if they did not want to be a part of it. There were a total of sixty-two students who participated in the program; twenty-nine in two first grade classrooms and thirty-three

in two second grade classrooms. The survey (see Appendix B) consisted of twenty-one questions; seven yes/no questions, four multiple-choice questions, five matching questions, and five picture identification questions. The questions were adapted from the U.S. Department of Agriculture's Agriculture in the Classroom program and meant to determine changes in gardening knowledge and some fruit and vegetable preference after exposure to the gardening program. The post-garden survey included five additional questions asking for the students' opinions of the garden.

The pre-garden survey was administered on April 5, 2011. Before the survey, letters of consent were sent home with each student and returned to the student's teacher to be given to the researcher. Also, on the day of the survey, letters of assent were given to each student who was taking the survey to sign and give to the researcher. Due to absences, fifty-eight surveys were completed. The post-garden survey was administered on October 5, 2011. Fifty-eight surveys were completed. After eliminating survey results for students who weren't present in either the spring or the fall, 50 results were left to compare. The results of the survey were then entered into a spreadsheet using numbers as unique identifiers for each student, for confidentiality purposes, and the answers were coded. The results were analyzed in two ways. The first analysis used a one-tailed t-test to compare the mean number of correct answers for each question and determine if there was any significant change from the pre- to post-garden survey. The second analysis used ANOVA to determine if there was a significant difference in the number of correct answers between the types

of questions (Yes/No, multiple choice, matching, and picture identification) that were used for the survey.

Analysis of Participant Observations and Stakeholder Interviews

To analyze the data, I read through the transcribed interviews and observations and identified six major themes that emerged in the interviews and observations that would help to answer my question: Communication and coordination, use in the classroom, barriers to implementation, interest by students, teachers, and other stakeholders, benefits of the garden, and drawbacks of the garden. Communication and coordination refers to the efforts to organize the garden between myself, the principal, the teachers, and other stakeholders. Use in the classroom refers to how the teachers used the garden as a part of their curriculum. Barriers to implementation refer to the issues that came up along the way, whether they were from within the school or community, or outside factors. Interest by students, teachers, and other stakeholders refers to the willingness of those parties to be a part of the garden project and their attitudes towards the project. Benefits of the garden refer to any benefits that were experienced by parties involved with the project. Drawbacks of the garden refer to any negative outcomes or experiences that were associated with the garden for any of the parties involved. I used these themes to code field notes and phrases from interviews for analysis.

Validity

As a largely qualitative case study, I focus on giving an honest account of the case as it was communicated to me through observations, interviews, and surveys. Yin (2009, p. 40) lists four tests for validity:

- Construct validity: identifying correct operational measures for what is being studied
- Internal validity: seeking to establish causal relationships… as distinguished from spurious relationships
- External validity: defining the domain to which a study's findings can be generalized
- Reliability: demonstrating that the operations of a study can be repeated, with the same results

Yin also explains tactics that can be use to address each test. To ensure construct validity, I collected evidence from multiple sources so that conclusions are supported by more than one source. To ensure internal validity, I employed the analytic tactic of pattern matching, linking causes to effects using different data sources. External validity, when dealing with case studies, refers to analytic generalization rather than statistical generalization (Yin 2009). This case was not a representative sample of a larger universe in which a certain phenomenon is happening. Instead, it is meant to provide an exmple of how issues such as lack of funding and internal instability, which are affecting many schools, could be addressed in program implementation. To address reliability, I used standard and established methods to conduct this case study and

gather information. However, because of the nature of my participant observation and my relationships with the community, it would be difficult for another researcher to replicate those results.

Dealing with Ethical Challenges

To ensure the ethical nature of this research, I submitted the human subjects review form to the Insitutional Review Board. The surveys and interviews were only conducted after the application had been approved as exempt. In administering the surveys and for any classroom observations, the parents of students involved were informed of the study and signed a letter of consent and the students signed a letter of assent. The letters explained the study purpose and proceedures, and noted that it was completely voluntary. Before the interviews, the interviewees also signed a similar letter of consent.

There are also ethical implications to being a participant observer. As a participant observer, it is easy to go into a community, cause disruption, and then leave without worrying about the consequences. Because this study took place in my hometown, this was not an option for me. Pocahontas is not only a community in which I have an interest but my family is still a part of that community. I took steps to ensure the ongoing success of the garden; through securing funding and finding someone to take care of the garden in the future, with the intention of making any disruptions I caused with this study as minimal and as positive as possible.

Chapter 4

Results & Discussion

Three research questions were examined in this case study: How was the school garden set up? Why was it set up in that manner? And what are the benefits that stemmed from the garden? This chapter will present the evidence and discuss the findings from the case study as they relate to the research questions.

The How & Why of the Garden Process & Program

There were three major themes that emerged from studying the process of setting up the school garden: the importance of communication; the importance of a knowledge and understanding of community relationships; and factors that promote the future sustainability of a school garden program.

Classroom Involvement

The question of who should be involved in a school garden is important because it will likely affect the outcomes of the garden. In Pocahontas, the elementary school principal, Mrs. Jorgenson, and the elementary teachers answered the question of which students would be involved with the garden. After I met with Mrs. Jorgenson, she spoke with teachers in grades K-3, asking if they would be interested in being involved in a school garden; they all said yes. I asked the teachers in the interviews if the garden was presented as a required program or an optional program, to better understand if they had willingly become involved with the garden. They unanimously replied that they had the option to decline involvement but liked the idea and thought it would be a great

opportunity for the students. With so many changes happening in the school district, from restructuring to curriculum changes, it was important that the teachers willingly became involved with the garden so that they would work through any initial difficulties and not be resentful of the time it would take away from their classroom. After an initial meeting between Mrs. Jorgenson, the teachers, and myself, Mrs. Jorgenson independently made the decision to involve only the first and second grades in the program. When the new school year started in the fall, the students who had been involved in the spring were now second and third graders so first through third grades were part of the program in the fall.

In addition to the elementary students involved with the garden, high school students also played a part in the garden setup. This was made possible through the involvement of Mrs. Jarvis, the high school science teacher who volunteered to help with the garden after hearing the presentation at the school board meeting. Although the seedlings that her class attempted to grow in the greenhouse did not survive, her students played a crucial role in preparing the garden beds for planting and helping with the elementary students on planting day.

Communication Among Stakeholders

A major theme that emerged from the interviews and from my own observations was the importance of communication in setting up and running the garden program. Collaborative theory calls for bringing all stakeholders involved in a project into the decision-making process in order to ensure that all views are heard and knowledge is exchanged, leading to the free flow of information and development of ideas (Healey

1997, Forester 1989). Innes and Booher (2010) specifically call for face-to-face meetings. The case in Pocahontas would have benefited from more closely following those principles.

The elementary teachers, Mrs. Jorgenson, and myself had just one face-to-face meeting for ten minutes before school one day, to introduce the program and try to answer any questions. The short time frame allowed me to present my ideas for the garden but did not allow for much discussion. After that meeting, Mrs. Jorgenson insisted that she would be the relay person between the elementary teachers and myself. She stated that it would be better for all parties; I would only have to worry about contacting one person and the teachers had so much going on that it would just be easier for her to arrange things with them since she saw them regularly. Issues quickly developed. When attempting to arrange meetings or classroom visits, I would email my available dates to Mrs. Jorgenson approximately two weeks early, with a reminder email at one week, and then again 2-3 days before. Plans were never finalized earlier than the day before a visit or meeting and on one occasion, the morning of. When I visited the classrooms to give the pre-garden surveys and on planting day, I got the impression that the teachers had been told very little about what was happening. In my interviews with teachers, conducted in August and October, my suspicions were confirmed. One teacher noted, "[Mrs. Jorgenson] was the relay person… I'm not really sure that everything got through." Another said, "We didn't have much communication. [It was] really bad." Although I had tried to make plans early, the teachers were only asked about their availability one or two days before I was planning to visit. In another

instance, the third grade teachers who had been at the first meeting but were not involved in the spring, were never told anything more about the garden. One of them did not know the project had gone forward until I contacted her in the fall to ask if her class could visit the garden.

This lack of communication had multiple consequences. First, the teachers were unable to speak with me about any expectations they had about the garden program such as where it would be located, how they would like to be involved with it, and any ideas they had for implementation (i.e. more closely involving high school students). Nor was I able to communicate to them the expectations that I had for the program such as how many times I would like them to work in the garden or how they might use it in their classrooms. They were also unaware of the resources that were available to them to help with the implementation of the program, such as the "Growing in the Garden" curriculum or a list of standards and benchmarks that would apply to the garden. In turn, this affected the way the garden was utilized by the teachers and, therefore, the benefits experienced by the students. Face-to-face meetings would have addressed many of the issues that arose because of the lack of communication.

Fortunately, there was an opportunity to address this in the middle of the year when Mrs. Jorgenson left PAC for another school. I interviewed the first and second grade teachers individually and asked their opinion on the best method of communication. Because face-to-face meetings are difficult to arrange, the teachers and I decided to use group emails in the fall to communicate. This allowed me to communicate with all of them simultaneously while keeping Mr. Davidson, the new

principal, in the loop. It also allowed the teachers or Mr. Davidson to email me back with any specific questions or concerns, and to set up garden and classroom visits individually. As a result, the teachers felt more comfortable with the program and became more knowledgeable about what was happening. The sharing of knowledge to increase understanding is precisely what collaborative theory encourages for a successful project (Healey 1999).

The observations and interview results also raise questions about relying on an intermediary to play such a significant role in the process. In Pocahontas, the elementary principal, Mrs. Jorgenson, played a central role in the setup of the garden. She was the first person that I approached about the garden and she immediately liked and supported the project. Without her support, a third party such as myself would not have been able to go into the school to start such a program. It was through her that I gained access to the institution and had the initial legitimacy needed to start the program. To have her as the point of contact with the school initially made sense because, in theory, she could more easily communicate with the teachers to coordinate visits and disseminate information. She would also take the responsibility for working out any scheduling issues and other conflicts with the teachers so I could focus on setting up the physical garden site. However, because Mrs. Jorgenson often failed to follow through on her end, it nearly derailed the project, as the elementary teachers were frustrated and confused about the program.

Using an intermediary is unique to a situation like Pocahontas where a third party, or outsider, introduces the idea of a garden instead of the garden being

introduced by a teacher or the administration. Someone who was already a part of the institution would already have a system of communicating with other individuals within that institution. However, that does not mean that the lessons learned in this study are applicable only to third party situations. It is still necessary for all parties to have a full understanding of the program; to communicate expectations from the beginning and to have open lines of communication to facilitate coordination.

Curriculum Integration

Ideally, a garden would be fully integrated into the classroom, becoming a regular part of the curriculum and an extension of the traditional classroom. In Pocahontas, the initial plan was that the classes would make weekly visits to the garden, to take care of it and learn from it. In reality, the students only made it out to the garden once in the spring (for planting) and once in the fall (for harvesting). All teachers stated that the primary reason for the few visits was time, in two respects; accessibility to the garden and space in the curriculum for garden lessons. Although the garden was only a mile away, getting students to the garden requires arranging a bus, loading them,

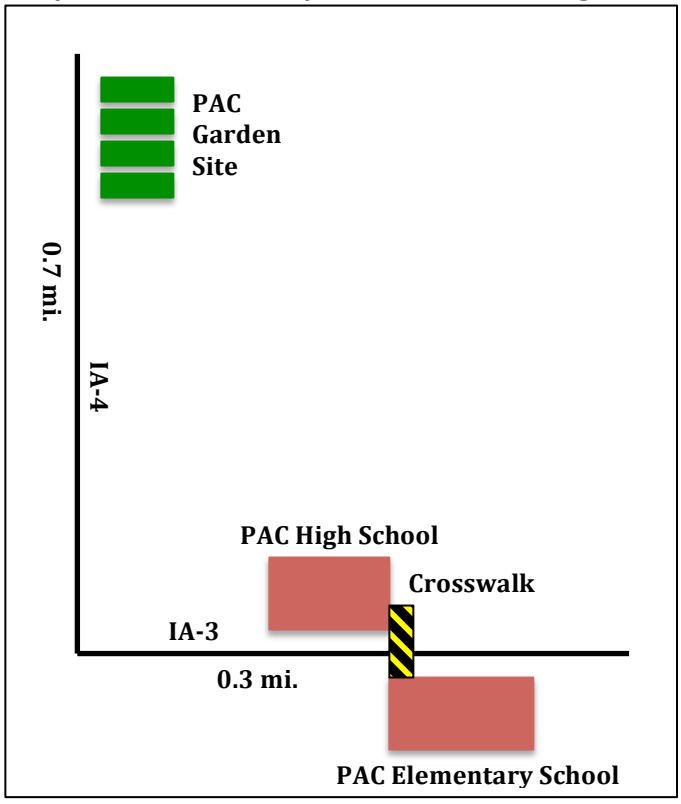


Figure 4.1

spending 30-45 minutes at the garden, and getting students settled after returning to school. One teacher noted that 30-45 minutes is longer than students' attention spans but that any shorter time would not be worth the effort to get to the garden. Students also could not walk to the garden because the only way to get there requires walking along two busy highways (Figure 4.1). The teachers noted that if the garden were within walking distance, such as at the high school, it would be much easier; they could take 20 minutes to walk over, make some quick observations, and return to the classroom to talk about it or integrate it into a lesson. It may seem counterintuitive that, in a rural area that is losing population, it is difficult to find land for a garden close to the school, but it raises an interesting point regarding land use at schools. Perhaps more open space should be included in plans for schools to allow for playground space as well as room for a garden.

Teachers also noted difficulty in finding time in their curriculum for a garden. During the 2010-2011 school year, the Iowa Department of Education restructured the standards and benchmarks that had been used by teachers to develop their curriculums while at the same time requiring teachers to directly tie everything they teach to a standard or benchmark for their grade level. Coming at the same time as the state-mandated curriculum changes, the garden was an addition to an already full plate. One teacher stated, "Last year we had issues with changing standards and benchmarks…so we didn't know what we were really teaching and what we weren't supposed to be teaching." Another teacher noted that the benchmark that she used for garden lessons is no longer a benchmark for that grade and said, "We're not supposed to keep our

favorites. If it's not in your curriculum, you're not supposed to do it." Another states, "You're so worried about the testing so I don't feel like I can do anything off-course." A fourth teacher adds that, "There's so much that we have to do besides just teaching the standards and benchmarks… so in order to do the hands-on stuff like [the garden], it seems like it's getting harder and harder to work that in." There was a consensus that hands-on work, like what was experienced in the garden, was valuable and important for kids, but that making large blocks of time available for it was difficult.

Mrs. Jorgenson had informed me at the beginning of the process that the teachers were feeling overwhelmed with the changing standards and benchmarks so I selected the "Growing in the Garden" curriculum to make it easier for teachers to integrate the garden into their lessons, including areas beyond science, such as writing and math. The curriculum lists learning objectives at the beginning of each lesson that closely match many of Iowa's standards and benchmarks for lessons in all subject areas. I had given the curriculum to Mrs. Jorgenson to pass on to the teachers, however, when I asked them if they thought it was helpful, none of the teachers knew about it. Again, this highlights an issue that may arise as a result of relying on an intermediary. After I described the curriculum, the elementary teachers expressed regret that they had not known about it sooner and interest in using it in the future. This suggests that the garden may have been more closely integrated into the classrooms if the teachers had been aware of the curriculum.

The teachers did not completely ignore the garden; they simply taught their regular curriculum and brought in the garden where it fit. In first grade, they focus on

plants in the fall so they used the spring visit as a review and the fall visit as supplemental to what they were already learning. Since they focus largely on conventional agriculture in the fall, the teachers saw the garden as a valuable addition to their curriculum, allowing them to show another facet of agriculture. In both second and third grade, they learned about life cycles and plant parts and their jobs. Second grade does their unit in the spring, which matched up with the spring visit, and they used the fall visit as an example of harvest. Third grade does their plant unit in the fall so it matched perfectly with their visit. In terms of non-traditional lessons, only first grade used the garden as inspiration for a journal and artwork. However, when I suggested that, in the future, there might be non-traditional ways of using the garden in their classroom, one teacher replied that she could use it for story problems in math and another proposed using it as inspiration for journals. Use of the garden in areas outside of science would allow it to be a valuable part of the curriculum throughout the growing season, so the science curriculum would not have to match with the garden.

One solution to the difficulty of integrating a garden into the school curriculum would be to take it out of the school day and offer it after school or offer it as a summer program. However, there are issues with both of these options. As an after school program, students would no longer be able to utilize the school's transportation to get to the garden, making it very difficult to get there. Furthermore, many of the students rely on school busses to get them home after school. If they took part in an after-school program, their parents would have to arrange to pick them up from the garden, which would be problematic if they did not have a parent working in Pocahontas. Offering the

garden as a summer program entails the same issues with transportation. Additionally, by the time school is out, it is very late to be planting many garden vegetables, leading to slow growth and limited production. A summer garden program had been tried at the Conservation in 2009 and was discontinued for those reasons.

Bringing in Other Stakeholders

Another major theme was the importance of relationships for the success of the garden. Manuals for setting up school gardens repeatedly mention community involvement as necessary for success and the results from this case study serve to reinforce that view. It was clear from the beginning of this program that outside stakeholders would have to be a part of the program to make it a success due to the limited resources available from the school. Indeed, without the involvement of the Pocahontas County Conservation and Pro Co-operative, the garden project could not have existed. Gaining the support of these stakeholders for the project was facilitated by my knowledge of their respective roles in the community and prior relationships with people involved in those organizations.

The major contribution from the Conservation was the use of the land for the garden. Unfortunately, open land at the elementary school is at a premium. Most of the open space is on the playground, which Mrs. Jorgenson stated was already too small for the number of children that have to use it. The rest of the open space was either not large enough to fit a garden or was too heavily shaded to provide adequate growing conditions. The high school, located across the street from the elementary school was

also considered but, due to construction, there was no open space available, making it impossible to have the garden on school grounds.

Looking around the community, the Conservation was a natural choice to approach for assistance because they regularly hosts and organize educational outdoor workshops, and it was also likely that they had land under their jurisdiction that could be used for a school garden. They agreed to have the garden on their land, located about one mile away from the school. The Conservation not only had land available, but offered a number of other benefits as well. They had hosted a summer garden camp two years prior and so, had fencing, watering equipment, and tools that could be used for this garden. This eliminated some significant expenses of those garden necessities. Mrs. Peterson, the education director at the Conservation, also volunteered to take care of the garden when the students would not be able to make it out and to assist teachers with lessons in the garden if they would need it.

Another major contributor to the garden was Pro Co-operative, the local grain elevator, which contributed $500 to cover expenses for the garden. As one of the largest businesses in town and with a history of supporting community project, Pro Co-op was a natural choice to approach for funding. As an agriculture related business, they also had an interest in funding agriculture education, even though garden produce is not the sort of crops that they work with. Having worked with Pro Cooperative in the past, I have a personal relationship with many of the people in management positions, including the Manager who approved the funding, so I knew that my request had a good chance of being fulfilled. Despite these advantages obtaining the funding was still no

easy task. I prepared a budget and a short description of what the program entailed and called repeatedly over the course of five weeks to ensure that the manager would consider the request. Finally, I stopped in to say hello, explained the program, and walked out with a check for the full amount.

There were also two outside stakeholders that were considered for involvement but were not included in the first year due to a lack of time for generating adequate interest; Iowa State University Extension/4-H, and Pocahontas County Master Gardeners. I had discussions with the Extension Youth Program Specialist, Lisa Zeman, during the beginning planning stages. She had said that she was willing to help in any way that she could once the physical garden was set up. We discussed starting a gardening 4-H club, which would be open to students in grades 4-12, and would help maintain the garden in the summer. The students would also be able to use the produce as exhibits at the county fair. However, the announcement was not put in the monthly 4-H newsletter until April and there were few inquiries. It may be pursued in the future when there would be more time for promotion and recruitment.

It was hoped that the Master Gardeners' involvement would partner with classrooms to help teachers who lacked gardening experience. I had presented the idea at the first teachers' meeting and it was met with an enthusiastic response. I thought that it might appeal to the gardeners because they are required to give back 40 hours of community service per year in exchange for the 40 hours of training that they receive free every year. However, I sent out an email inquiry and received just one response when six were needed, so I did not pursue it any further. Because there were only two

visits to the garden over the course of the growing season and teachers weren't using any new curriculum in the classroom, the having the master gardeners involved ended up being unnecessary for the first year but it may be something the teachers could pursue in the future.

Pocahontas County Extension and the Master Gardeners are examples of organizations could be involved in the future to expand the program or to provide resources. The untapped resources may also indicate a wider interest in gardening within the community. Indeed, in some of the early discussions about the garden there was talk about simultaneously starting up a community garden but it was also tabled for lack of time. The school garden program has served as a catalyst, sparking interest in the community that will translate to support in the future.

The Value of Building Relationships

One of the greatest outcomes of collaboration may be found, not in the achievement of a final goal, but in the relationships that are established that can be utilized in the future (Innes and Booher 2010). In the case of the PAC school garden, multiple new relationships between stakeholders were established that could be valuable in the future; the most notable ones between the elementary teachers and Mrs. Jarvis at the high school, and between the school and the Conservation. Although the elementary school and the high school are located across the street from each other, there is little communication between teachers at the two schools. The garden served to bring students and teachers from the elementary and high school together on a common project and, because Mrs. Jarvis has committed to coordinating the project in

the future, I expect the relationship to remain active. It also opened the door for increased collaboration, as evidenced by the interest by both the elementary teachers and Mrs. Jarvis in having the high school students more involved with the elementary students in the future. The relationship between the school and the Conservation is also important. Although the Conservation has an established relationship with the school and regularly presents programs in the classrooms, the Conservation had encountered resistance from the school in the past for bussing students for off-site programs. Now that the garden program has been established and the school has consented to an off-site program, there may be a greater openness for other programs in the future, even if the garden would move to another location.

Benefits of the Garden

In addition to examining the process of setting up a school garden, the purpose of this study was to assess the benefits that stemmed from the garden. According to the literature on school gardens, the benefits associated with them include; increased fruit and vegetable consumption, combating obesity (McAleese and Rankin 2007; Ratcliffe, et al. 2011), increased communication skills (Waliczek, Bradley and Zajicek 2001), and increased test scores (Klemmer, Waliczek and Zajicek 2005). To understand these benefits at this school, I utilized pre- and post- garden surveys in addition to stakeholder interviews and participant observation. The surveys were used to assess changes in general knowledge about gardening and food preferences while participant observation and interviews with teachers were used to indicate other positive or negative impacts of the garden on students.

As already explained, the students were only exposed to the garden once in the spring and once in the fall. This limited their exposure to the garden and, with a large gap in between, may have made it difficult for the students to understand what happened between planting in the spring and harvesting in the fall and limiting the knowledge they may have gained. I was able to observe the students on four occasions; the two garden visits and the two survey visits.

Discussion of Survey Results

The first survey was conducted on April 5, 2011, before any visits to the garden. The survey consisted of twenty-one questions covering general knowledge and preferences about food. The second survey was conducted on October 5, 2011, after the final visit to the garden, and included the same twenty-one questions plus five additional questions regarding students' attitudes towards the garden (see Appendix B). The surveys did not ask for any personal information such as age or gender, seeking only to identify changes in the group as a whole. Surveys were only included in the analysis if the student was present for both the pre- and post-garden surveys; thus, surveys by new students or students who had moved away were excluded from the analysis. Overall, 50 students from two grades (1st and 2nd grades in the spring, 2nd and 3rd grades in the fall) participated in both surveys. A one-tailed t-test was performed to test the means for each question. I also performed a two-tailed t-test to determine if there was an overall difference between the number of correct answers between the pre- and post-garden surveys.

The results of the analysis comparing answers from the pre- and post-garden surveys can be seen in Table 4.1. There was a large variation in the percentage of correct responses for the pre- and post-garden surveys. Pre-garden percentages ranged from 24% for correctly identifying the picture of eggplant to 86% correctly answering that potatoes do not grow on trees. Post-garden percentages ranged from 28% for the picture of eggplant to 90% correctly identifying strawberries. The likely explanation for the low percentage of correct responses for the picture of eggplant is that it is a vegetable with which children may not be familiar. Students seemed to do well on both surveys with questions about foods that would likely be more familiar such as strawberries (84%-90%), potatoes (86%-88%), peas (78%-84%), and pickles (78%-84%).

Overall, although the percentage of students answering each question correctly increased for all but two questions, the results do not indicate a significant increase in overall knowledge. However, there were three questions where the increase was statistically significant at the .05 level:

- Are bananas grown in Iowa?
- Some insects are good for a garden; and
- Identifying the picture of raspberries.

It is difficult to connect these answers to the garden for a number of reasons. Although I was present for the lessons in the garden, I do not know what was covered in the classroom. During the spring visit to the garden, we talked about how to plant and what was needed for the plants to grow. During the fall visit we talked about local

Survey Results Analysis

Question	% Correct (Yes) - Pre	% Correct (Yes)- Post	Diff.	T-Test Result	P-Value
Yes/No					
Do you like broccoli?	58%	50%	-8%	0.7971	0.2137
Potatoes grow on trees.	86%	88%	2%	0.2945	0.3845
The part of the carrot we eat is the stem.	66%	78%	12%	1.3348	0.0925
Do you like tomatoes?	46%	38%	-8%	0.8049	0.2114
Are bananas grown in Iowa?	52%	78%	26%	*2.8043	0.0031
Some insects are good for a garden.	70%	86%	16%	*1.9485	0.0272
Do you like raspberries?	62%	68%	6%	0.6239	0.2671
Multiple Choice					
Fertilizer is used in a garden to _____.	38%	48%	10%	1.0049	0.1587
Harvest occurs in the _____.	76%	80%	4%	0.4785	0.3167
Pickles are made from which garden plant?	78%	84%	6%	0.7593	0.2248
Tomatoes are the main ingredient in ____.	66%	72%	6%	0.6435	0.2607
Matching					
Carrot	44%	54%	10%	0.9951	0.1611
Celery	46%	50%	4%	0.3966	0.3463
Lettuce	76%	66%	-10%	1.0975	0.1376
Wheat	54%	44%	-10%	0.9951	0.1611
Apple	66%	72%	6%	0.6435	0.2607
Picture Identification					
Red Pepper	62%	70%	8%	0.8389	0.2018
Eggplant	24%	28%	4%	0.4518	0.3262
Raspberries	58%	76%	18%	*1.9305	0.0282
Peas	78%	84%	6%	0.7593	0.2248
Strawberries	84%	90%	6%	0.8866	0.1888
Total Test 1 - Total Test 2~	62%	69%	7%	1.2019	0.2377

n=50, a=.05, Level of Significance=1.6606

~Level of Significance=2.03224

Table 4.1

foods and what is grown in Iowa in the fall, but did not specifically mention bananas. We also did not have raspberries in the garden. One possible explanation for the increase in answers may be that the teachers covered these areas in the classroom as a part of their curriculum, although they did not mention covering these subjects in their interviews. Another possible explanation may be that, as a result of the garden, students were more attentive to how and where foods are grown. Perhaps they looked more closely at different fruits and vegetables in the grocery store and thought about these questions on their own.

There was also an 8% decrease in the number of students indicating that they like broccoli and that they like tomatoes. This is somewhat unexpected because school gardens are associated with an increase in fruit and vegetable preference (McAleese and Rankin 2007) but, again, the results were not statistically significant enough to indicate a general shift in preferences for fruits or vegetables.

I also tested the results to see if the type of question used had any effect on the answers. This is important because if the type of question does have a significant effect on the answers, the survey may not accurately measure the students' knowledge. One third grade teacher had said she was "devastated" by the number of students that she saw answering the matching questions incorrectly on the post-garden survey because they had just talked about plant parts in class but she noted that the students hadn't seen matching on a test so perhaps that was why they were struggling on that part. First grade teachers also mentioned during the pre-garden survey that matching was

difficult for the students and in my observations of students during the surveys, they did seem to have more questions about the matching portion.

I used ANOVA to analyze differences in answers between the types of questions and the results of this analysis are shown in Table 4.2. In both the pre- and post-garden surveys, the lowest percentage of correct answers was in the matching section. However, based on the ANOVA analysis, the results are not statistically significant, so students' performance on the matching questions are not significantly more difficult than the other types of questions.

Analysis by Question Type

Type of Question	Pre-Garden % Correct	Post-Garden % Correct
Yes/No	69%	83%
Multiple Choice	65%	71%
Matching	57%	57%
Picture Identification	61%	70%
ANOVA - F-Value	1.64329	1.77385
Critical F-Value=4.54877		

Table 4.2

The five supplemental questions on the post-garden survey were included to get an indication of how the students felt about the garden; if they liked or disliked it, and why. There were two yes/no questions and three open-ended questions. The results can be seen in Table 4.3. The students overwhelming responded that they liked the garden (47 of 50 students). The most common reason given was that they liked planting or harvesting (13) while other common reasons fell into the categories of; "I like gardening/being outside" (8), "It's fun/cool" (7), and "It has food" (8). Of the two students who responded that they did not like the garden, one stated that it was hot and boring, and the other stated that he or she disliked waiting for the food to grow. The survey also asked about their favorite and least favorite parts of the garden. Most

Supplemental Question Results	
Question	**Responses**
Did you like the garden?	
Yes	47
No	2
Why? (Like)	
I like vegetables.	3
I like gardening/being outside.	8
I like planting/harvesting.	13
It was fun/cool.	7
It has food.	8
Other	5
Why? (Dislike)	
It was hot & boring.	1
We had to wait for food.	1
What was your favorite part?	
Planting/harvesting/growing things	25
Tomatoes/peppers/plants	7
Other	7
What was your least favorite part?	
Planting/harvesting/growing things	4
Tomatoes/peppers/plants	3
Other	11
No Response	32
Do you have a garden at home?	
Yes	30
No	19

Table 4.3

students (25) answered that planting, harvesting, or growing things was their favorite part of the garden. The most common response for least favorite part was a blank (32). Many students asked what to do if they did not have a least favorite part and we told them to leave it blank, attributing to the high rate of no responses. There was no clear theme in the responses of those who did supply an answer for least favorite part with the largest number in any one category (4) responding that they did not like planting, harvesting, or growing things. The fifth question asked if the students had a garden at home or one at a relative's that they helped with. Thirty students responded that they did have a garden at home or that they helped with. Because of this, I did a test to control for having a garden at home. Using a one-tailed t-test, I compared the means for each question in both the pre- and post-garden surveys

between students who had a garden and those who did not. There was not a significant difference between answers for any of the questions on either survey.

It must be noted that, because the students had just two exposures to the garden the results of the survey may not tell the whole story. It could be expected that with more visits to the garden and a greater integration of the garden into the curriculum the students would have more opportunities to gain knowledge about gardening and food. In that situation, the survey may be a more useful indicator for assessing what was learned. Although some students did have more exposures due to their participation in the summer session, this varied widely from student to student. Of the students who were involved, some attended only one or two sessions while others were present nearly every week. Because of these inconsistencies, I did analyze the effects of summer school enrollment on the results.

Discussion of Observation & Interview Results

Some benefits from school gardens, such as students' enjoyment or sense of ownership, may be difficult to quantify but can be deduced in other ways. The teachers agreed that having the garden was a great experience for the students. Four of the six elementary teachers specifically mentioned how beneficial it was to have a hands-on learning opportunity. One stated that it is "just as important, if not more important than sitting down and taking tests." Another said the best thing about the garden for the kids was, "just being able to go out. It's the best way to learn." Three teachers also mentioned how a garden was beneficial because many of their students didn't have any experience with a garden, planting and growing things. One stated, "Some of [the

students], they've never seen a garden. You would be so surprised. They grew up in town, that's all they know." Others noted that it was great for the students to be able to see what they had planted and come back to harvest it, even if they didn't see much in between. One teacher noted that they also learned about some unfamiliar vegetables like kohlrabi and red, orange, and green peppers. Another noted that the kids really seemed to take ownership of the garden and felt like it was theirs.

One of the best benefits for the teachers and myself, as someone who helped organize the project, was how excited the students were about the garden. One teacher said they were, "so excited that I was worried about keeping them under control," and that the students talked about the garden "all the time." When I was in the classroom for the pre-garden survey, the students asked if we could go out that day even though it was still cold and raining. At the post-garden survey, they asked their teachers when they were going to visit again and were disappointed when they found out there wouldn't be another visit. During the visits the students were extremely enthusiastic, cheering when I asked if they wanted to see the garden and showing their teachers and myself what they had picked. These observations were backed up by the results of the additional survey questions where forty-seven of the fifty responding that they liked the garden. This is important because students are excited for something at school and they're excited about learning in that environment.

In addition to the benefits for the elementary students, Mrs. Jarvis also mentioned benefits for the high school students that were involved. She said that it was great for them to get some hands-on experience, nurturing the seedlings, testing the

soil, and doing other experiments that would have tangible outcomes in a real-world project. Mrs. Jarvis also stated that it was good to work with the elementary students on the planting day because the high-school students then became the teachers, helping the elementary students to plant and work in the garden. One of the greatest benefits that she saw from the garden was that it drew the more quiet and reserved students out of their shell, allowing them to take ownership and get involved even though they rarely speak up in the classroom. She also said that the garden project should continue because, "We're all about preparing kids to be responsible citizens and to be able to take care of themselves and society. What better way to do that?"

Going Forward

Lessons for sustainability also emerged from the interviews and observations. All of the teachers expressed interest in being involved with a garden program in the future, especially if they can find a way to match it with their standards and benchmarks. The garden would also need a "champion," someone who can coordinate the garden in the future. The elementary teachers noted that, if the project were to continue in the future, someone would need to be in charge of the garden in order to arrange visits, coordinate resources, plan for the season, and arrange for care of the garden over the summer. The need for such a person was also evident from my observations. The elementary teachers seem to have too much going on for any one of them to take on the responsibility of managing a school garden. Indeed, they noted that such a project would not have happened if there hadn't been someone to take the time to set up the physical garden and encourage them to visit.

This is where Mrs. Jarvis, the high school teacher, can play a key role. She has volunteered to help with the garden and take it over so that it could continue into the future. In the first year, she not only involved her students with the garden but she also used her contacts at local businesses to obtain discounts on seeds and seedlings for the garden. In her interview, she described the plans that she was already making for next year. Because the high school greenhouse is not well maintained, she purchased two small, counter-top "greenhouses" to use in her classroom so they can grow seedlings for next year. She also plans on collaborating more with the elementary classes; working with those teachers earlier in the year to make plans and involve the elementary classes in growing the seedlings and other experiments, an idea that piqued the interest of the elementary teachers when it was mentioned in the interviews. In the longer term, Mrs. Jarvis envisions expanding the program after the teachers have a few years to become comfortable with it; to involve more grade levels and possibly to provide food for the school cafeteria. In the interviews, the elementary teachers noted that they became more comfortable with the program through the course of the first year and have ideas about how to integrate it with their standards and benchmarks in the future, especially with the help of the "Growing in the Garden" curriculum. Furthermore, much of the instability that was troubling the school last year has subsided for the 2011-2012 school year as it seems that consolidation pressures have eased for the immediate future, standards and benchmarks are unchanged, and teachers are happy with the current elementary principal. With plans in place for the future and the support of

administration and other stakeholders, the garden may be an even bigger success in the 2012 growing season.

Chapter 5

Summary & Recommendations for Future Programs

The three research questions for this study asked: How was the school garden set up? Why was it set up in that manner? And what are the benefits that stemmed from the garden? The study of this garden yielded some interesting results. These are summarized in this chapter. The chapter also makes some recommendations for future programs and changes in the research process.

Obviously, whether or not the project as a whole should be considered successful depends on the definition of success. If success is defined by the number of times the students visited the garden and quantitative improvement in students' knowledge about gardening, then it was limited. The students were able to visit the garden only two times, which is a small number considering the length of the growing season (April to October). Also, it is often the responsibility of the students to maintain their school gardens but, because of the limited time the students spent in the garden in Pocahontas, the Conservation took care of most of the maintenance.

However, if success is defined by the establishment of a garden program and benefits such as the enjoyment of students and the sense of ownership that they gained, then the program can be judged as successful. Despite the shortcomings noted above, four raised garden beds were set up and planted utilizing resources from community such as land, soil, the wooden beds, equipment, time, and money. First, second, and third graders from Pocahontas Area Elementary School visited the garden on two occasions and seemed to be very excited about it. The Pocahontas County

Conservation, where the garden was located, hosted a summer gardening program so that students could be involved through the summer and help to maintain the garden while school was not in session and plans are in the works for the 2012 growing season.

Summary of Findings

Planning literature on collaborative theory emphasizes the importance of communication in collaborative processes. In a truly collaborative process, all stakeholders should be involved and should freely share knowledge, information, and ideas (Forester 1989; Healey 1997). Indeed, communication among stakeholders emerged as a very important element in the process of setting up the garden in Pocahontas. In the beginning, Mrs. Jorgenson, the elementary principal, served as the intermediary between the elementary teachers and myself. Although this was intended to make the process easier for everyone, Mrs. Jorenson failed to pass on all of the information that I had given her regarding the garden, leading to frustration on both sides and affecting the implementation of the program.

The importance of relationships in the community for the success of a school garden cannot be overstated. Pocahontas Area Community School District (PAC) is, like many other schools, facing a shrinking budget that leaves few resources for programs such as school gardens. Without the contributions of the Pocahontas County Conservation and Pro Co-operative, the garden in Pocahontas would not have existed. It is important to build relationships within the community and understand how those relationships can be used to support a project; in this case, a garden. Those

relationships may also be useful in the future, as lines of communication have been established and stakeholders can collaborate on additional projects and programs.

The study also highlighted elements that contribute to the sustainability of garden programs. Most prominent is the need for a "champion" to keep the program going. In this case, I came in as a third party and served as the catalyst for the first year; finding resources, starting the garden and coordinating visits. These are responsibilities that someone else will have to take care of in the future. The elementary teachers do not have the time to coordinate amongst themselves nor does any one particular teacher have the desire to take on that responsibility. As one second grade teacher stated, "There's so much that we have to do… There's always added things." Another teacher stated, "[The garden] definitely needs one person in charge to plan everything and take care of it through the summer." If the garden had been started from a teacher within the school or the administration, this transition would not have to be made. However, even in those circumstances, if there were more than one classroom working with the garden, it would still be useful to have one person who would be responsible for coordinating resources and visits to avoid confusion.

Another necessary condition for sustainability is to make it as easy as possible for teachers to integrate the garden into their curriculum. The changing requirements for standards and benchmarks at the state level resulted in teachers being confused about what they should or should not be teaching. Because every lesson has to be tied to a standard or benchmark, the elementary teachers were having difficulty matching lessons in the garden to their science benchmarks. To that end, I provided the "Growing

in the Garden" curriculum, which closely matches the lessons to the state's standards and benchmarks in areas beyond science. The teachers were not aware of it in the first year but were interested in using the curriculum in the future and more closely integrating the garden with their classroom.

The benefits of the garden were assessed using pre- and post-garden surveys in addition to interviews and field observations. The pre- and post-garden surveys were meant to measure students' general knowledge of food and gardening. Overall, the number of correct answers on the surveys increased from the pre- to post-garden surveys. However, the increase was not enough to be statistically significant except for three of the twenty-one questions. The reasons for the increases in these questions cannot be directly tied to the garden, because none of them were addressed directly during my observations. However, there are some plausible explanations. It is possible that these areas were covered in the classroom, although they were not mentioned in the interviews. It is also possible that, as a result of the garden, students were more attentive to how and where foods are grown. Perhaps they looked more closely at different fruits and vegetables in the grocery store and thought about these questions on their own. These are interesting questions that may provide motivation for further study. I also tested the different types of questions to determine if there were any significant differences in student performance based on question type. If there were significant differences, it may indicate that the survey was not a useful tool for measuring students' knowledge. Although there were differences between the types of questions, none of them were statistically significant.

Some of the greatest benefits that came from there garden were not easily quantifiable. The teachers emphasized that they enjoyed the garden because it provided a hands-on learning opportunity, which they feel is very valuable. One teacher stated, "It's just as important, if not more important, that sitting down and taking tests." Another, when asked about the benefits of the garden, replied, "The hands-on. They actually get to see [what happens]. Some of them, they've never seen a garden, they've never done that." The students were also very excited about the garden and were always eager to visit the garden to work and see what had changed. They cheered when asked if they would like to go to the garden and many asked during the post-garden survey if their class would be visiting again. Students also developed a sense of ownership for the garden and took pride in the work they had done and what they had grown. A second grade teacher stated that one of the benefits of the garden was "the whole process of being connected to the soil and they had some ownership in the project… it was important to them." The overwhelming response on the post-garden survey (47 of 50 responses) was that the students liked the garden. This enthusiasm will likely play a part in keeping the garden going because teachers are able to see how excited students are about learning in the garden.

Revisiting the Research Process

After reviewing this study, I have developed the following recommendations for performing similar research in the future. Ozer (2007) calls for in-depth studies of school garden implementation in order to more accurately connect implementation practices to benefits. This study intended to address that gap in the literature but came

up short because the Growing in the Garden curriculum was not used in the classroom and I was unable to observe lessons in the classroom, so I do not know the full extent of what the students were taught. A future study could more closely examine the implementation in the classroom and connect it to benefits experienced by students. To study a classroom more closely, all aspects of implementation would have to be recorded. At minimum, this would include the number and specific content of the lessons that were taught in the classroom and in the garden, how the garden was used as inspiration in the classroom, and observations of students in the classroom and the garden. This would be an interesting way to extend this study or to evaluate an existing school garden program.

Program Recommendations

Before establishing the school garden program in Pocahontas, I consulted a number of resources and manuals with recommendations for how to set up a successful and sustainable school garden. My experience with the garden in Pocahontas supported many of the recommendations in those manuals. For example, bringing in multiple stakeholders and knowing where to turn for help. To these, I would like to add two recommendations from the garden in Pocahontas.

First, start small. A garden does not have to be huge to be effective and it can always grow if it is successful in the beginning. A garden can start with one classroom and a small planter box if that is all the available resources can support. Pocahontas was a relatively small garden, involving only four beds and two classes in the spring, with three classes in the fall. However, it took a lot of time and effort to organize the

resources to establish the physical garden and to coordinate garden visits and lessons for the 4-6 classrooms. Mrs. Jarvis, the high school teacher who will be coordinating the garden in the future has plans for growth but will keep it small for another year or two to stabilize the program and allow people to become comfortable before introducing a new concept. She does not want the program to grow too large, too quickly, and end up failing for lack of resources or support.

The second recommendation is twofold; bring all stakeholders together in the beginning and work together to clearly outline expectations for the project. Such recommendations are made by Healey (1997, 1999) and Innes (1995, 2010) in collaborative planning literature with regards to bringing stakeholders together and working towards a common goal. They are also supported by my experiences in Pocahontas. It was clear in the interviews at the end of the growing season that my expectations for the garden differed from that of the elementary teachers and that those differences impacted the implementation of the program; especially the number of visits to the garden and the curriculum used in the classrooms. The decision not to meet together in the beginning was made because of scheduling difficulties but, in retrospect, would have been worth the trouble. Through the interviews and discussions that I had with the elementary teachers at the end of the year, it seems that our expectations have been clarified. However, I recommended that Mrs. Jarvis bring all the teachers together before making any final plans for the 2012 growing season.

Conclusion

As school gardens increase in popularity across the country, I was happy to be able to extend the movement's presence to Pocahontas, Iowa. Although the garden was small and the students were only able to visit the garden twice, the program has been established and will be operational in 2012; hopefully with more visits from elementary students and continuing collaboration with stakeholders such as the high school and Conservation. It goes to show that a garden does not need to be large enough to supply the cafeteria to make a difference, nor do students need to visit a garden often to experience benefits from it. Students can learn about food and gardening from a planter box by a window, a 100-acre farm, or anything in between and they can get excited about one visit to a garden or twenty. The effort does not need to be grand to be effective. This study served as a single case to inform the larger body of literature on school gardens; leading to recommendations for future programs and supporting the claim that school gardens are beneficial to teachers and students. The possibilities of this study are endless; it may serve as inspiration for school gardens in other small towns, or to motivate the students involved to have their own garden or try more vegetables, or it may only serve to make students excited each time they visit the garden. In any scenario, it has been a success.

Chapter 6

Epilogue

What is planning?

A question that I am often asked after telling someone that I am getting a planning degree is, "So what exactly does a planner do?" Over the last two and a half years, I have found that there are many possible answers to that question. A planner may fit into the "traditional" planning role, dealing with zoning laws and land use regulations. A planner may also fit into the rational planning model, focusing on applying scientific methods to work through issues in a community; using the best information available to develop alternatives and consequences before choosing the path that would be taken (Brooks 2002).

However, the planning profession is evolving; and some, myself included, view planners as organizers and facilitators. In this view, planners bring people and organizations together to confront issues and achieve goals. In tough economic times, cities often do not have the resources to implement projects on their own. As a result, multiple stakeholders must be involved to undertake projects: rejuvenating a neighborhood, for example. To me, planning is about bringing people together and organizing them to work towards a common goal. It means bringing stakeholders together to not just identify the goal but to work together to figure out the best way to achieve that goal. Planning, to me, is about collaboration and facilitation.

It is collaborative theory that is best suited to this view of planning. John Forester (1989) was one of the first to talk about the role of planners in bringing

stakeholders together. Indeed, he rejects the idea of planners as rational cogs who provide information to decision-makers. Forester specifically talks about the role of planners in neutralizing power relations and organizing citizens to empower them to take part in a democratic planning process (Forester 1989). Patsy Healey (1997) also speaks to the role of a planner as a facilitator, encouraging conversations and communication. Building on the communicative action theory of Habermas, Healey notes that open lines of communication are necessary for true collaboration (Healey 1997). To facilitate this communication, the planner should have an understanding of local knowledge and the relationships between parties that would be involved in the process, in order to identify the power dynamics and how they might be neutralized. The planner can then bring the stakeholders together in a common context to work towards a common goal. This sentiment is echoed by Judith Innes who states that planning is less about rational processes and more about interacting with a community and encouraging communication (Innes 1995). By bringing multiple stakeholders together, she claims, a more effective solution will be achieved than any one stakeholder could have achieved alone, making the role of the planner as the person who brings the stakeholders together very important (Innes and Booher 2010).

Planning & School Gardens

School gardens would not typically be mentioned within the realm of planning. However, when planning becomes more about organization and bringing people together, the fit is much more apparent. Resources for school gardens consistently recommend the involvement of multiple stakeholders to ensure success and

sustainability (California School Garden Network 2010). As a result, planners, schooled in collaborative theory, have a skill set that can be helpful for setting up a school garden. The FAO lists three criteria that are necessary for a successful school garden; knowing how to cultivate people, knowing how to cultivate plants, and knowing where to go for help (Food and Agriculture Organization of the United Nations 2005). Planners focused on collaboration know how to cultivate people and, through their involvement with the community, would know where to go for help. My experience in Sustainable Agriculture as well as planning meant I would also know how to cultivate plants, making working with a school garden a perfect fit.

My role in the school garden in Pocahontas was largely as an organizer and a catalyst. On the part of the school, there was an interest in doing this sort of project but they simply did not have the means. One of the teachers mentioned that she had wanted to have a school garden for years but knew that the school did not have the resources to set one up and she did not know how else to do it. All I had to do was find the resources and the hope was that the interest within the school would keep the garden going once I was gone. Because Pocahontas is my hometown, I already had the knowledge of the community and relationships with community members to know who to approach for resources. It was a matter of approaching those organizations, which rarely interact, and showing them what they could contribute to the school garden and the value to their organization and to the community from such a project.

In addition, this project was always being shaped by the stakeholders who were involved. The Pocahontas County Conservation, the elementary and high schools, and

myself, worked together to shape the development of this project. It was my idea but I wanted it to be *their* project so that they would have a sense of ownership and keep it going after I had left. I served as the organizer but plans were made using constant input and feedback from the various stakeholders. How large would the garden be? What classes would be involved? What would be planted? What would the students learn? How would it be taken care of in the summer? All of these questions and many more were answered by the stakeholders and I did my best to take all of the input and feedback and ensure that it was implemented in the way that they wanted.

Researcher Involvement

As the garden project was located in my hometown, this had an affect on how the project was implemented. In some ways, I came into this project as both an insider and an outsider. I was an insider because of my knowledge and relationships within the community and this helped me in many ways. Because I was already a member of the community, I did not have to work to gain credibility. I did not have to work to gain the trust of most stakeholders because I had interacted with most of them in the past. I encountered evidence of this from the very beginning. For example, members of the school board and school administration mentioned that they were happy to support me as a graduate of the school district who had returned to give something back to the community. Discussing the role of trust in collaboration, Innes (2010) notes that assurances are often made to take the place of trust in collaborative processes before parties will work together because no trust exists between them. However, trust often develops as a result of those collaborative processes, paving the way for future

collaboration (Ch. 4). This was an issue that I never had to face and the project may not have received such support as readily if it were someone from outside of the community that had proposed the project.

I also knew who to approach for resources. I knew that Pro Co-operative had a history of generously supporting projects within the community and that the Conservation would have land and tools that they might be willing to contribute. I knew that the Secondary Road Department probably had soil that they might donate because they have little use for it. I did not have to take the time to become familiar enough with the community to know that these resources were available. In this way, my "insider" status was very helpful.

I cannot specifically identify ways in which being an insider was harmful, although I can think of some possiblities. I may have missed other resources available in the community simply because I am not familiar with them or do not have established relationships with them. There may be more people or organizations who would like to be involved but are simply unaware of the project. For example, Mrs. Jarvis, who took the responsbility of getting seeds and seedlings for the garden, approached a local greenhouse and another business that I had not contacted to donate those seeds and to obtain discounts for those they could not donate. It is also possible that my familiarity with the teachers affected their answers during the interviews, specifically those asking for criticism of the project or process. This, of course, makes it difficult to identify changes that would make the project better or more appealing to the teachers, affecting the sustainability in the long term. One of the greatest concerns with

being an insider is that it may have affected my ability to determine what was really happening throughout the process of setting up the garden. I was aware of this possibility from the beginning and did my best to carefully document what was happening to revisit it later when any emotional bias would have faded. I also attempted to cross reference any findings, using stakeholder interviews and student surveys to confirm my observations.

Although I was an insider to the community, I was also an outsider to the school. I had attended the school and was familiar with the teachers and administrators, but I did not have an understanding of the inner workings of the school or relationships between teachers and administrators. This proved particularly interesting with the elementary principal, Mrs. Jorgenson. She took the reins, prefering to serve as the intermediary between the teachers and myself. As discussed in prior chapters, because she failed to pass on information in many cases, the implementation of the project was compromised. Teachers were confused about what was happening and frustrated with the seeming lack of planning despite my efforts to communicate clearly and plan events over a week in advance. After Mrs. Jorgenson left the school over the summer, I became aware of these issues and worked with the teachers and the incoming principal to set up a system where I communicated with everyone directly. If it had been someone within the school who had organized the garden, another teacher, for example, that person would have known about those issues and would have likely avoided some of the issues that I encountered.

Lessons Learned

The objective of this project was to establish a garden but I learned a lot in the process. Manuals and research can help immensely, but it is not until you are actually doing a project that you learn how to apply your skills. One of the biggest lessons I learned is to truly gain an understanding of the relationships between stakeholders. Even though I was an insider to the community, I was an outsider to the organization that I was working with and blind to the politics within that organization. The issues that developed with communication between Mrs. Jorgenson and the teachers may have been lessed had I not just assumed that she would fulfil the responsibility that she volunteered to take on. This experience holds lessons that could be extrapolated to planners in many other situations. One is that a planner cannot assume to know how an organization works; whether that organization is a city, a neighborhood association, or a school. Each organization has its own set of norms and political interplay that can affect how projects are implemented and how people work together. It is also important, as an insider or an outsider, to be wary of what people say and the partnerships that one makes. As an insider, you would be more likely to gather information from sources that are most familiar to you, possibly missing out on a different perspective or pool of knowledge and information. As an outsider, the partnerships that you form to gain access to an organization may alienate you from other members of the organization; affecting how those members work with and communicate with you.

I also learned how important it is to work together to establish goals and expectations for a project. Collaboration literature emphasizes the value of face-to-face interaction with *all* stakeholders and I failed to follow through with that on the part of the elementary teachers, assuming Mrs. Jorgenson was an adequate representative. In doing so, I was unable to communicate my expectations with the teachers and they were unable to tell me what they would like out of the the garden. The interviews helped to address this issue, but I have no doubt that the teachers would have found more value in the garden if our expectations has been laid out from the beginning.

This was a school garden but it was also a community project and there are lessons that were learned from the process that could benefit other communities. This model of using collaboration to involve multiple stakeholders to make a project more successful could be particularly useful in communities that are strapped for resources; but there are unique challenges. As the communities are strapped for resources, so are many of the organizations within those communities. As a result, they may not feel willing or able to contribute to a collaborative project. The trick, then, is working with organizations to help them understand how the project is beneficial to them. For example, the Conservation was able to count the times that they hosted students in the garden as outreach and they were able to create a summer program using the garden. On the other hand, many organizations already realize that they must work with other organizations in order to survive; Iowa State University Extension, for example, has committed to increasing partnerships in the communities they serve. The planner, then, may simply serve as the person who facilitates the connections between

organizations that enables them to work together; similar to the role that I played in the school garden project. This highlights how a planner, as an expert in collaboration, can be so useful to communities and organizations.

To boil it down, I learned a lot about being a planner because I learned about working with people and encouraging collaboration. In one sense, a planner may be useful to a community as a technical expert; but in my view, a planner can do so much more than that. A planner can facilitate relationships and encourage communication and collaboration that can lead a community to develop solutions to problems that they support and that fit their needs. And, in my view, that is really what planning is all about, whether it be a school garden or neighborhood revitalization. In the case of this garden, I hope that the planning skills I utilized have indeed created a sucessful and sustainable contribution to the school and community.

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Appendix A

Teacher Interview

1. How did you become involved with the garden?

2. What did you think of the idea when it was first presented to you?

3. How would you rate the communication during the implementation process? In terms of what was going on, what was expected of you, etc.

4. The initial idea had been to integrate the garden into the school curriculum. Would you be willing, in the future, to make it a more integrated part of your curriculum?

5. Were you aware that a copy of the "Growing in the Garden" curriculum had been purchased for teachers to use in integrating the garden into their curriculum?

6. Would you be willing to use it in the future?

7. What topics did you cover in the classroom regarding gardening or plants?

8. Did you use the garden as a reference for any of those lessons?

9. Did you use the garden as a reference for any non-traditional assignments, such as writing or artwork?

10. What benefits, if any, did you as a teacher, experience from the garden?

11. What drawbacks?

12. What benefits, if any, did the students experience from the garden?

13. What drawbacks?

14. What do you see as barriers to the implementation of this sort of project?

15. What changes, if any, would you like to see with the garden?

16. Do you think the garden project should continue? Why or why not?

17. Any other comments/suggestions?

Appendix B

Name: _____

Garden Survey

Yes/No - Circle Your Answer

1.	Do you like broccoli?	Yes	No
2.	Potatoes grow on trees.	Yes	No
3.	The part of the carrot we eat is the stem.	Yes	No
4.	Do you like tomatoes?	Yes	No
5.	Are bananas grown in Iowa?	Yes	No
6.	Some insects are good for a garden.	Yes	No
7.	Do you like raspberries?	Yes	No

Multiple Choice - Circle Your Answer

8. Fertilizer is used in a garden to _____.
   a. make the garden smell good.
   b. feed the plants and make them grow.
   c. keep the bugs away.
   d. kill weeds
9. Harvest occurs in the _____.
   a. spring
   b. summer
   c. fall
   d.winter
10. Pickles are made from which garden plant?
    a. carrots
    b. potatoes
    c. squash
    d. cucumbers
11. Tomatoes are the main ingredient in _____.
    a. enchilada sauce.
    b. red jam.
    c. pizza sauce.
    d. cranberry sauce.

Matching - Identify which part of the plant you would eat.

12.	carrot	_____	a. root
13.	celery	_____	b. stem
14.	lettuce	_____	c. seed
15.	wheat	_____	d. fruit
16.	apple	_____	e. leaf

Identify the picture.


17. _____


18. _____


19. _____


20. _____


21. _____

Miscellaneous

22. Did you like the garden? Yes No

23. Why or why not? _____

_____

24. What was your favorite part of the garden? _____

25. What was your least favorite part of the garden? _____

26. Do you have a garden at home? Yes No